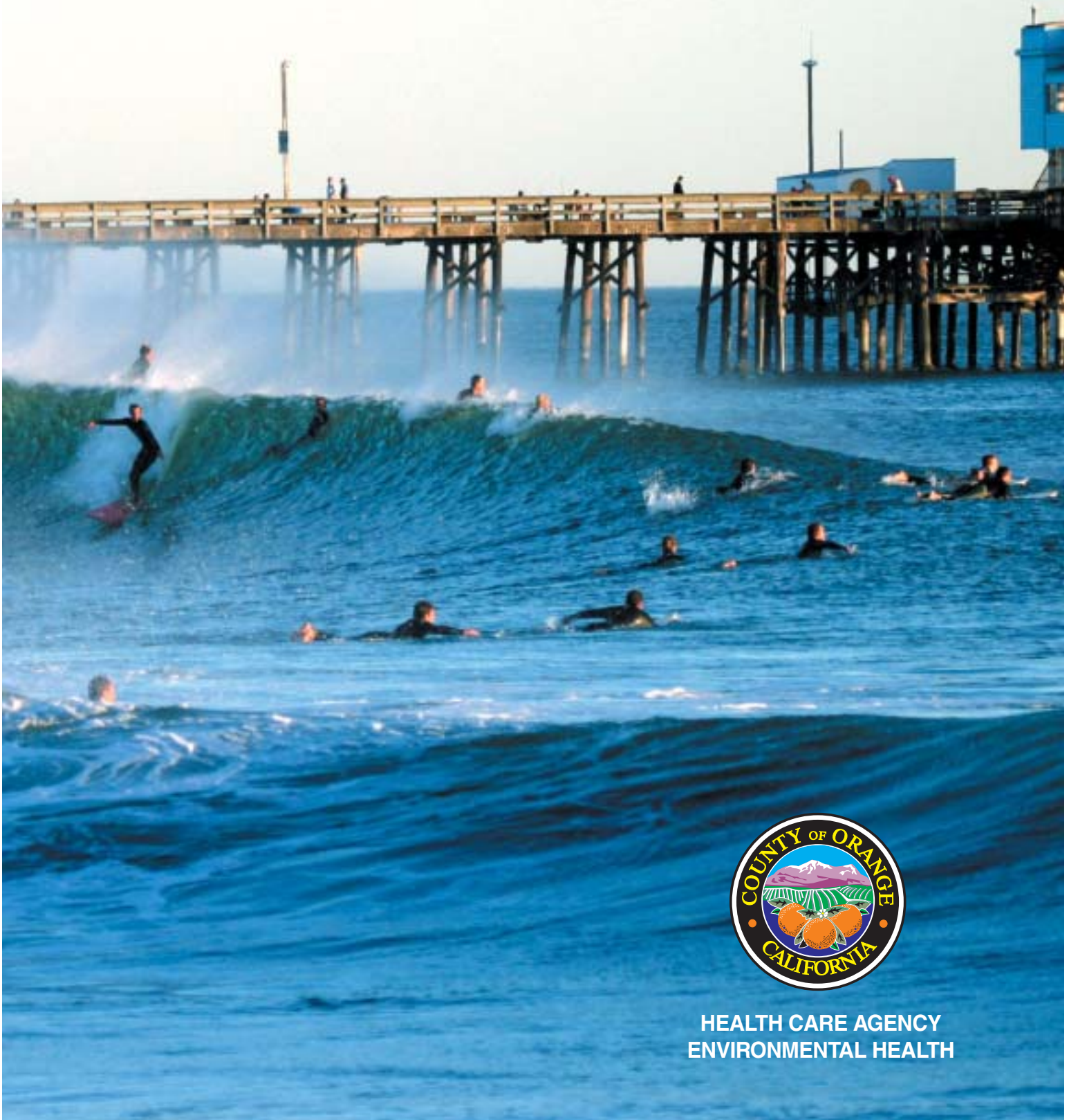


June 2003

2002 Annual Ocean and Bay Water Quality Report



HEALTH CARE AGENCY
ENVIRONMENTAL HEALTH

ACKNOWLEDGEMENTS

The *2002 Annual Ocean and Bay Water Quality Report* would not have been possible without the assistance of many people. The staff of Environmental Health's Ocean Water Protection Program wishes to acknowledge the support of the following:

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The staff of Environmental Health's Ocean Water Protection Program would like to thank the Marine Safety and Lifeguard Divisions of the cities of Seal Beach, Huntington Beach, Newport Beach, Laguna Beach and San Clemente; U.S. Ocean Safety Lifeguards; Orange County Public Facilities and Resources Department /Harbors, Beaches and Parks staff; and the State Department of Parks and Recreation staff for their continued assistance.

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TABLE OF CONTENTS

Executive Summary	III
Map of Orange County Coastline.....	IV
The Ocean Water Protection Program	1
<i>Ocean Water-Contact Sports Standards – Assembly Bill 411</i>	
<i>Disease Causing Microorganisms</i>	
<i>Warning Signs</i>	
<i>Beach Mile Days</i>	
Ocean and Bay Water Closures Due to Sewage Spills.....	6
<i>Sewage Spills and Ocean and Bay Water Closures 1987 – 2002</i>	
<i>Sewage Spill Caused Ocean and Bay Water Closures 1999 – 2002</i>	
Ocean and Bay Rain Advisories 2000 – 2002	13
Ocean and Bay Water Postings Due to Water Quality Standards Violations.....	14
<i>Postings for all Orange County Beach Areas 2000 – 2002 (April – October)</i>	
<i>Postings for Coastal Ocean Water Areas 2000 – 2002 (April – October)</i>	
<i>Postings by Indicator Bacteria 2000 – 2002 (April – October)</i>	
<i>Calendar Year Postings for all Orange County Beach Areas 2000 - 2002</i>	
Appendix 1	20
<i>Postings by Beach Area 2000 – 2002</i>	
Appendix 2	34
<i>30-Day Running Geometric Means for Selected Stations 2000 – 2002 (April – October)</i>	



EXECUTIVE SUMMARY

The *2002 Annual Ocean and Bay Water Quality Report* provides an analysis of bacteriological water quality for the 112 miles of Orange County's ocean and bay waters for the years 2000 through 2002, representing three full calendar years of Assembly Bill 411 (AB 411) Ocean Water-Contact Sports Standards implementation. This second annual report tracks bacteriological trends that may be used as a measurement tool for the ongoing water quality standards assessment of Orange County's ocean and bay waters and to provide this information to the public. The Report also incorporates historical sewage spill and ocean and bay water closure data from 1987 – 2002.

Major findings of the *2002 Annual Ocean and Bay Water Quality Report* are:

Sewage Spills and Closures (for calendar year):

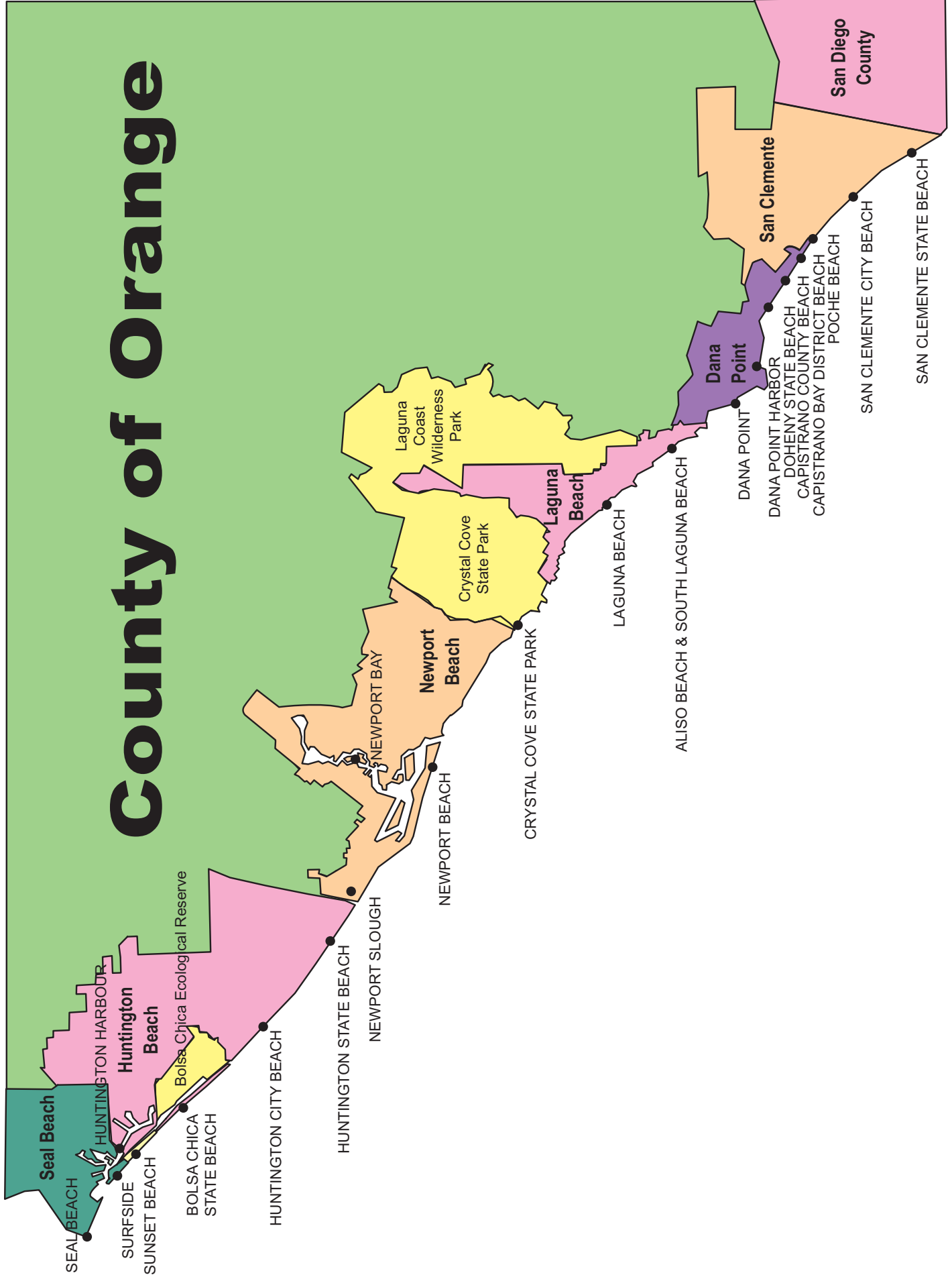
- The total number of closure Beach Mile Days due to sewage spills significantly decreased in 2002 for the first year since 1999 (the first year of Beach Mile Day calculations).
- In 2002, the total number of ocean and bay water closures and number of closure days due to sewage spills decreased for the first year since 1999.
- The total volume of sewage discharged for closures, the average volume of sewage discharged per closure, and the average number of Beach Mile Days affected per closure decreased in 2002.
- Private property owner sewage spills were responsible for a majority (54%) of the ocean and bay water closures in 2002 for the first year since 1999.

Postings (for AB 411 period April 1 – October 31):

- The total number of Beach Mile Days posted increased from 2001 - 2002 (279.3 to 363.9), but remained unchanged from 2000 (362.8).
- The total number of Beach Mile Days posted due to AB 411 standards violations for the period of 2000 - 2002 represents 1.4% of the total number of Beach Mile Days available for recreational water use during this period.
- The total number of Beach Mile Days posted due to water quality standards violations at coastal ocean water areas was highest at Doheny State Beach, Capistrano Bay District Beach and Huntington State Beach for the period of 2000 - 2002.
- Violations of the AB 411 enterococcus standard accounted for 61% of the ocean and bay water postings for the period of 2000 - 2002.

The *2002 Annual Ocean and Bay Water Quality Report* provides information and data which may be used by elected officials, governmental agencies, environmental groups, and all other interested parties to focus on the water quality issues facing ocean and bay recreational waters in Orange County.

County of Orange



THE OCEAN WATER PROTECTION PROGRAM

As part of the Orange County Health Care Agency (HCA), Environmental Health's Ocean Water Protection Program is responsible for protecting the public from exposure to ocean and bay water that may be contaminated with sewage or may cause illness due to elevated indicator bacteria levels along the County's 42 miles of open ocean coastline and 70 miles of harbor and bay shoreline. Ocean and bay waters used for full body-contact recreational activities such as swimming, surfing and diving must meet specific bacteriological standards to be considered safe for such purposes.

Over the past 40 years, the Health Care Agency and local sanitation agencies (Orange County Sanitation District and South Orange County Wastewater Authority) have been cooperatively testing the coastal waters in Orange County for bacteria that indicate the possible presence of disease-causing organisms. The sanitation agencies and HCA program staff participate in the weekly collection of water samples at approximately 150 ocean, bay and drainage locations throughout coastal Orange County.

Every day program staff review the results of bacteriological water samples and issue ocean and

bay water closures, postings and health advisories under the requirements stipulated by the California Health and Safety Code and Title 17 of the California Code of Regulations. When the results of testing indicate that one or more of the Ocean Water-Contact Sports Standards have been exceeded, the sampling frequency and locations may increase until the sample results meet established standards and/or the source of the problem is eliminated. In addition, the Ocean Water Protection Program staff respond on a 24-hour basis to investigate reports of sewage or other contamination incidents affecting Orange County's public beaches.

The Ocean Water Protection Program staff maintain an Ocean and Bay Water Posting and Closure Hotline and Web Page.

Ocean and Bay Water Closure & Posting Hotline: (714) 667-3752.

The Ocean and Bay Water Closure & Posting Web Page: www.ocbeachinfo.com.



Newport Beach

Ocean Water-Contact Sports Standards Assembly Bill 411

In 1999, bacteriological ocean water quality standards that are more protective of public health were added to the California Health and Safety Code (Sections 115880-115915) and the California Code of Regulations (Sections 7956-7962).

The standards are informally called “AB 411 Standards” and include the following:

- Required testing of the waters adjacent to all ocean and bay public beaches for total coliforms, fecal coliforms and enterococci bacteria that may indicate the presence of possible disease-causing bacteria, viruses and protozoa.
- Maintain and update the Ocean and Bay Posting and Closure Hotline.
- Established single sample standards for total coliforms, fecal coliforms and enterococci bacteria as follows:
 - Total Coliforms: 10,000 organisms per 100 milliliter sample.
 - Fecal Coliforms: 400 organisms per 100 milliliter sample.
 - Enterococci: 104 organisms per 100 milliliter sample.
 - Fecal:Total ratio: >1000 total coliforms if ratio exceeds 0.1.

- Established 30-day geometric mean standards (of five weekly samples) for total coliforms, fecal coliforms and enterococci bacteria as follows:
 - Total Coliforms: 1000 organisms per 100 milliliter sample.
 - Fecal Coliforms: 200 organisms per 100 milliliter sample.
 - Enterococci: 35 organisms per 100 milliliter sample.
- When any waters adjacent to a public beach fail to meet any of the standards described above, the local health officer shall post the beach to restrict access to the affected waters.
- Weekly testing is required from April 1 to October 31 if the following applies:
 - The beach is visited by more than 50,000 people annually.
 - The beach is located in an area adjacent to a storm drain that flows in the summer.
- In the case of a known release of sewage into ocean or bay waters adjacent to a public beach, the local health officer is required to:
 - Immediately close the affected ocean or bay waters until the source of the sewage is eliminated.
 - Collect bacterial samples from the affected waters.
 - Continue the closure until testing results of water samples meet the established standards.



Laguna Beach

Disease-Causing Microorganisms

Polluted runoff and untreated sewage released into recreational waters may result in swimmer exposure to pathogenic bacteria, viruses or protozoa. Disease-causing organisms may be present at or near the sites where polluted discharges enter the water.

The following table lists the types of organisms and the diseases (or symptoms) they may cause.

PATHOGENIC AGENT	DISEASE
Bacteria	
<i>E. Coli</i>	Gastroenteritis
<i>Salmonella (not typhi)</i>	Gastroenteritis, usually with fever; less commonly septicemia (generalized infection - organisms multiply in the bloodstream)
Some strains of <i>Shigella</i>	Gastroenteritis, usually with fever
Protozoa (Intestinal Parasites)	
<i>Cryptosporidium</i>	Diarrhea - Cryptosporidiosis
<i>Giardia lamblia</i>	Diarrhea - Giardiasis
Viruses	
Rotavirus	Gastroenteritis
Enteroviruses	Respiratory, rash, febrile illnesses; meningitis
Norwalk and Norwalk-like viruses	Gastroenteritis
Adenovirus	Respiratory and gastrointestinal infections
Hepatitis A (outbreaks associated with eating shellfish from sewage-contaminated water)	Infectious hepatitis (liver malfunction)

The levels of bacteria, viruses and protozoa decrease over time due to the following reasons:

- Die off due to sun (ultraviolet exposure), salt water or age.
- Predation by other organisms.
- Dilution.

Warning Signs

The yellow closure sign is posted when a release of raw sewage affects waters adjacent to a public beach.



The warning sign with the red and black border is posted when a violation of the AB 411 Ocean Water-Contact Sports Standards occurs.

The warning sign with the yellow and black border is posted near storm drains, creeks and rivers to advise the public of the risks associated with possible contamination from urban runoff.



Beach Mile Days

The term “Beach Mile Days” is used to present the measurement of the number of days and the area of ocean or bay waters that are closed due to a sewage spill or posted for a violation of the AB 411 Ocean Water-Contact Sports Standards.

Beach Mile Days (BMDs) are calculated by multiplying the number of days of a closure or posting by the number of miles of beach closed or posted:

$$(\text{Number of Days}) \quad \times \quad (\text{Miles of beach closed or posted}) = \text{Beach Mile Days}$$

For example, if a sewage spill resulted in the closure of $\frac{1}{2}$ mile of beach for 7 days then:

$$(7 \text{ days}) \quad \times \quad (0.5 \text{ mile}) \quad = \quad 3.5 \text{ Beach Mile Days of closure}$$

The total number of available ocean and bay Beach Mile Days for Orange County are:

$$(365 \text{ days}) \quad \times \quad (42 \text{ miles coastal}) \quad = \quad 15,330 \text{ Available Beach Mile Days}$$

$$(365 \text{ days}) \quad \times \quad (70 \text{ miles bays}) \quad = \quad 25,550 \text{ Available Beach Mile Days}$$

$$(365 \text{ days}) \quad \times \quad (112 \text{ miles total}) \quad = \quad 40,880 \text{ Available Beach Mile Days.}$$

Using BMDs is a more meaningful measurement of ocean and bay water impairment than using the number of incidences or the number of days since BMDs take into account both the amount of beach and the length of time of a closure or posting. The California State Water Resources Control Board and all California coastal counties use BMDs for reporting closures and postings which provides a standardized measure allowing comparison of different areas (beach to beach or county to county) or assessing trends over time.



OCEAN AND BAY WATER CLOSURES DUE TO SEWAGE SPILLS

When a known release of sewage is reported to the Ocean Water Protection Program staff, the ocean or bay water areas that may be affected by the sewage discharge are immediately closed to ocean water-contact sports.

The closure area is based on many factors including type of sewage (e.g., untreated, secondary treated, sewage sludge), volume of discharge, location of spill, ocean currents and tides, historical sewage spills in the area, and any other pertinent information. After the initial closure area is established, the appropriate agencies are notified, the area is posted with closure signs, a press release is issued, the Ocean and Bay Water Closure and Posting Hotline and Web Page are updated with the beach closure information, and bacterial sampling of the affected area is initiated.

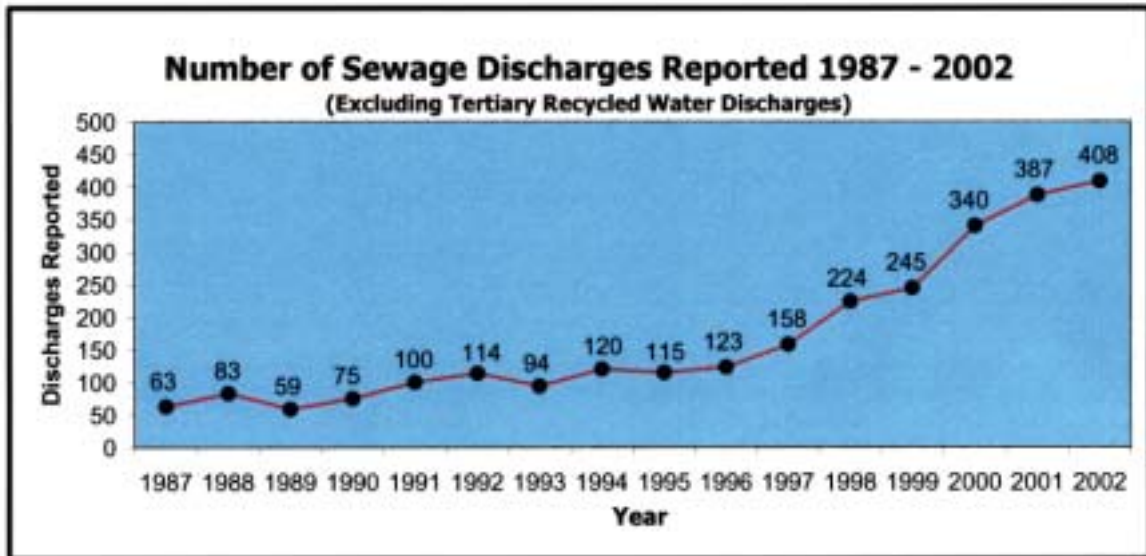
The closed ocean or bay water area will be reopened or reduced in size when the contamination source has been eliminated and after two daily consecutive sampling results indicate the affected area meets the AB 411 Ocean Water-Contact Sports Standards.

Status information regarding the closure is posted to the Ocean and Bay Water Closure and Posting Hotline at (714) 667-3752 and to the Ocean and Bay Water Closure and Posting Web Page at www.ocbeachinfo.com. Detailed information regarding closure events from 1999 – 2002 may be accessed from the Ocean/Bay Water Closure logs that can be downloaded from the Web Page.

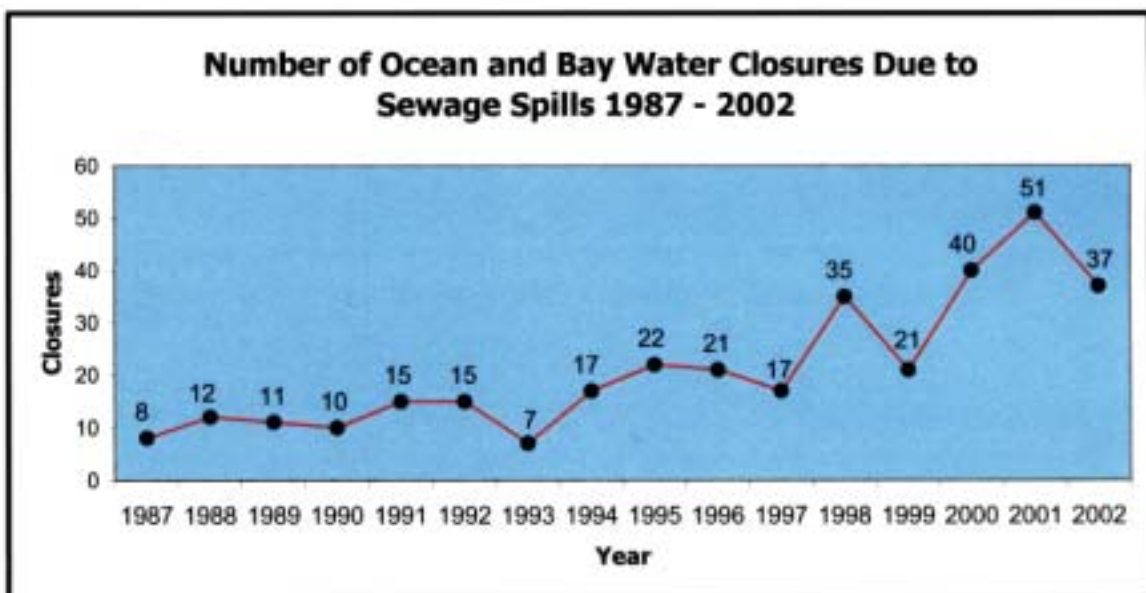


Sewage Spills and Ocean and Bay Water Closures 1987-2002

The increasing number of sewage discharges reported to the Orange County Ocean Water Protection Program by sanitation districts, cities that operate sewage collection systems, or private property owners from 1987 - 2002 is detailed on the following graph.

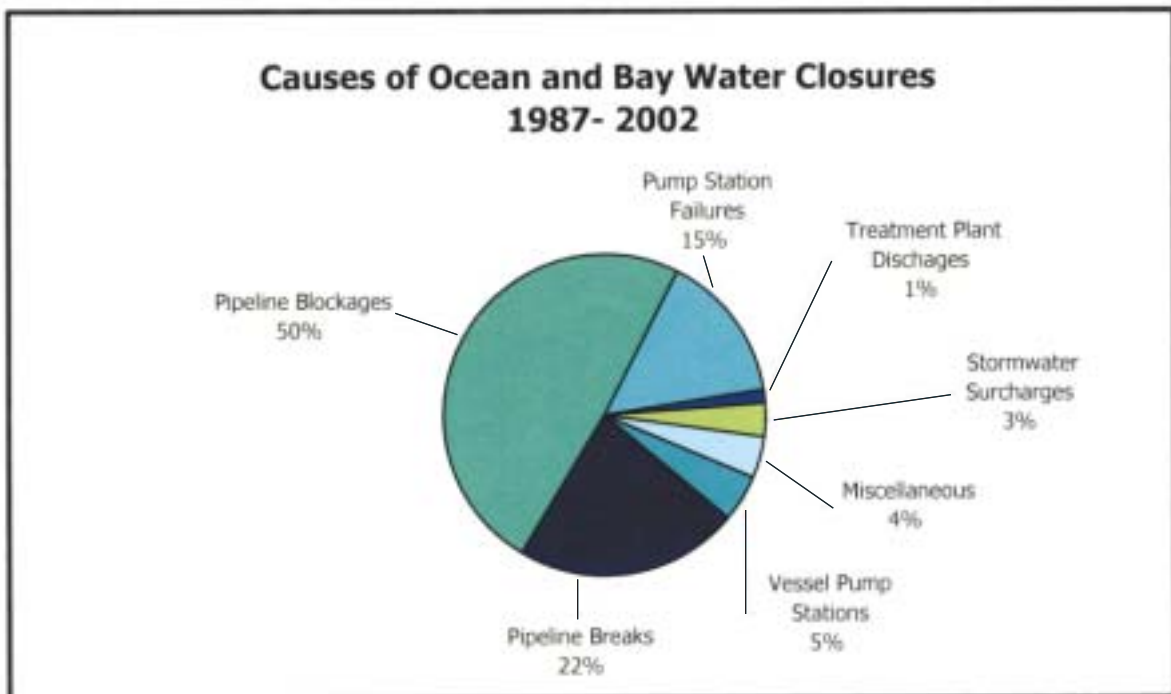


The number of ocean and bay water closures in Orange County due to sewage spills from 1987 - 2002 is detailed on the following graph.



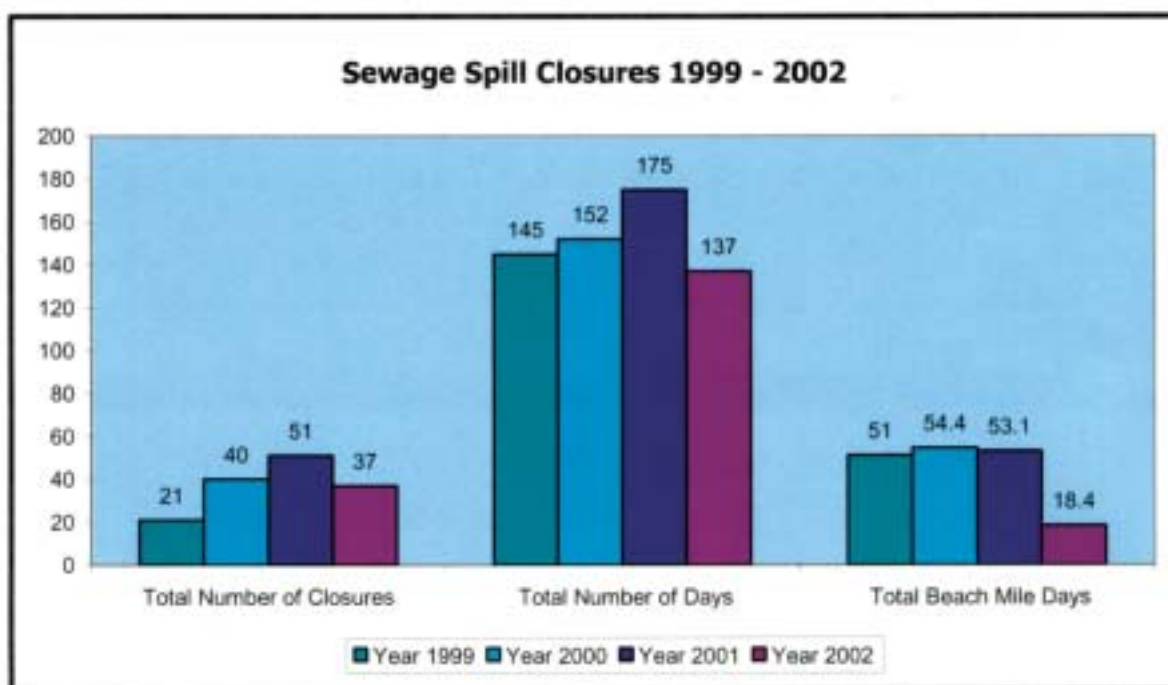
Sewage Spills and Ocean and Bay Water Closures 1987-2002 - continued

Sewage spills caused by pipeline blockages and pipeline breaks were responsible for a majority (72%) of the ocean and bay water closures in Orange County from 1987 – 2002, as the following chart illustrates.



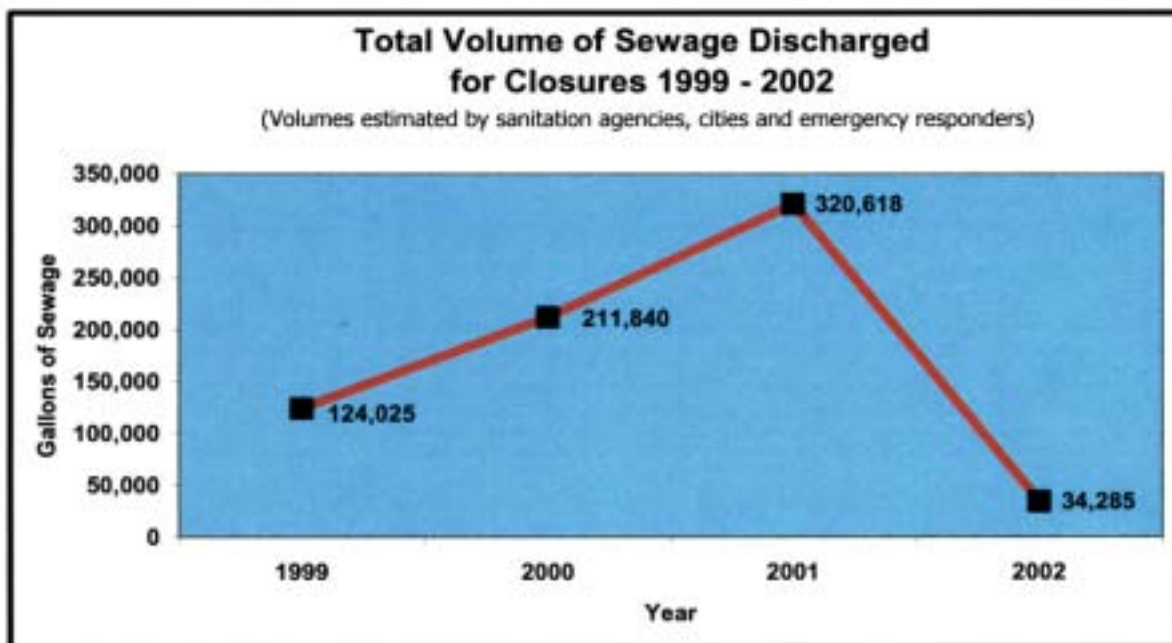
Sewage Spill Caused Ocean and Bay Water Closures 1999-2002

The following chart depicts the total number of closures, total number of closure days and total number of Beach Mile Days of closure in Orange County from 1999 – 2002 due to sewage spills. In 2002, there was a reduction in the total number of closures and total number of closure days for the first time since 1999, as well as a significant decrease in the total number of Beach Mile Days of closure.

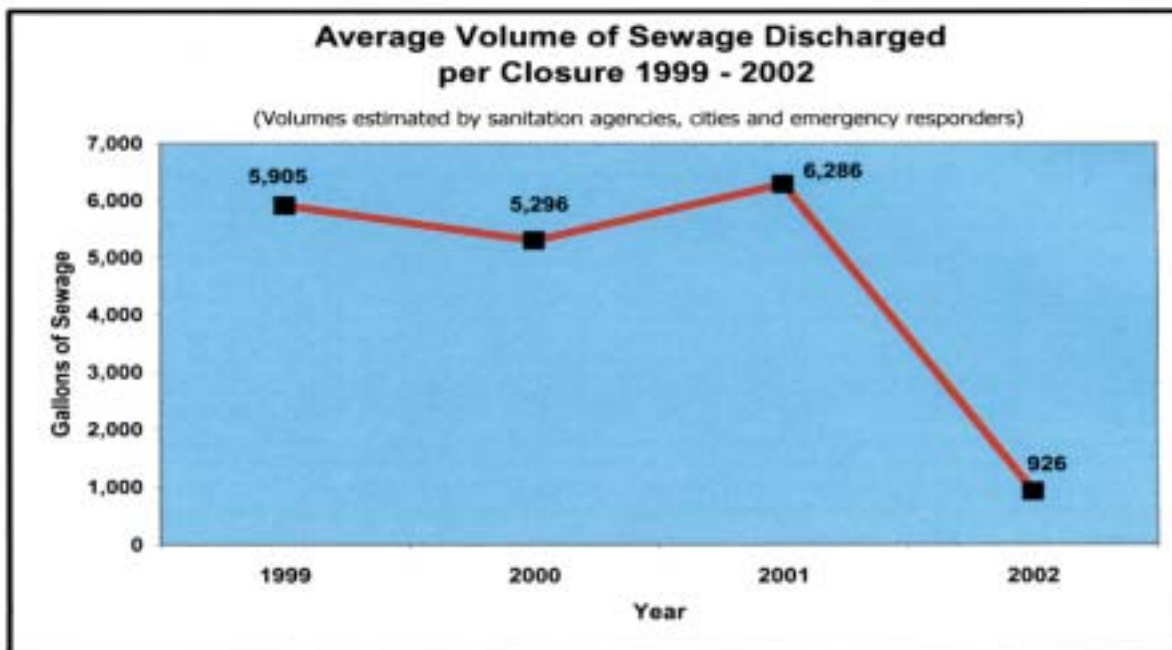


Sewage Spill Caused Ocean and Bay Water Closures 1999-2002 - continued

The total volume of sewage discharged resulting in sewage spill closure incidents from 1999 – 2002 is detailed on the following graph. In 2002, there was a significant reduction in the total volume of sewage discharged in sewage spill closure incidents.

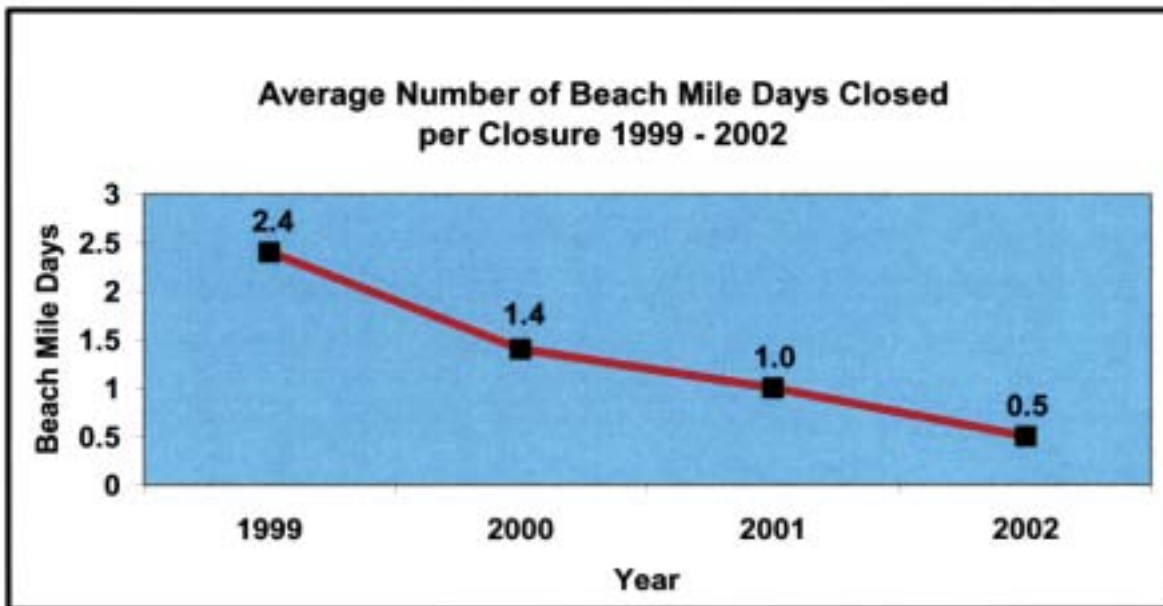


The average volume of sewage discharged per sewage spill closure incident from 1999 – 2002 is shown on the following graph. From 2001 to 2002, there was an 85% decrease in the average volume of sewage discharged per sewage spill closure incident.

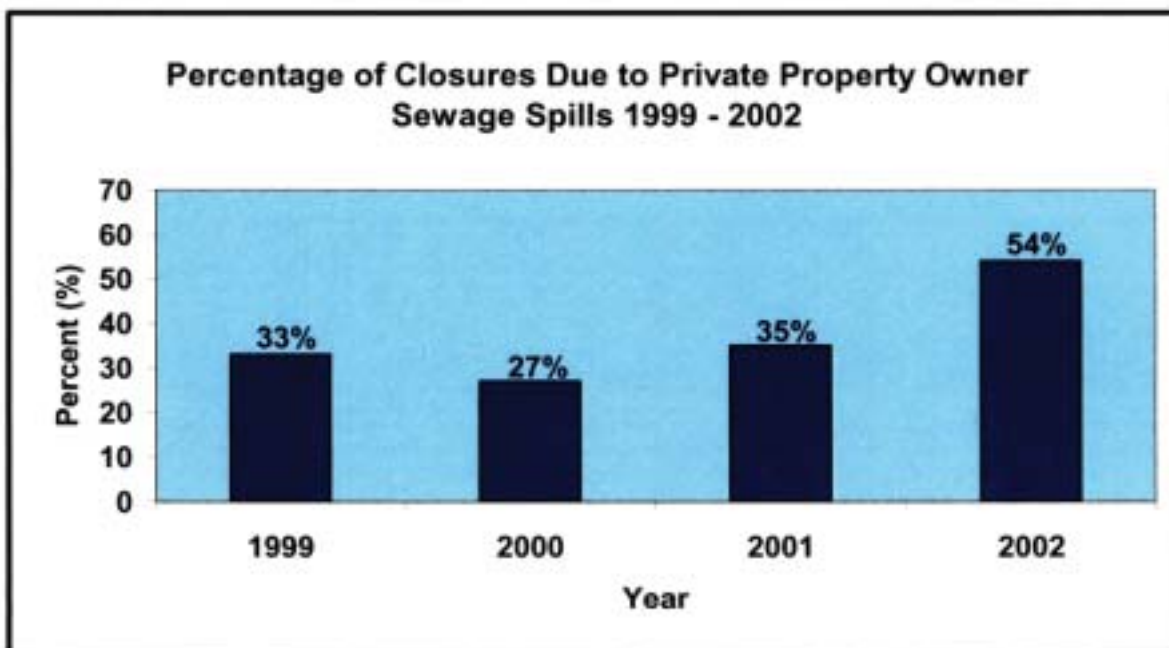


Sewage Spill Caused Ocean and Bay Water Closures 1999-2002 - continued

The average number of Beach Mile Days closed per sewage spill closure incident from 1999 – 2002 is shown by the following graph. From 1999 – 2002, there has been a decrease in the average number of Beach Mile Days closed per sewage spill closure incident.

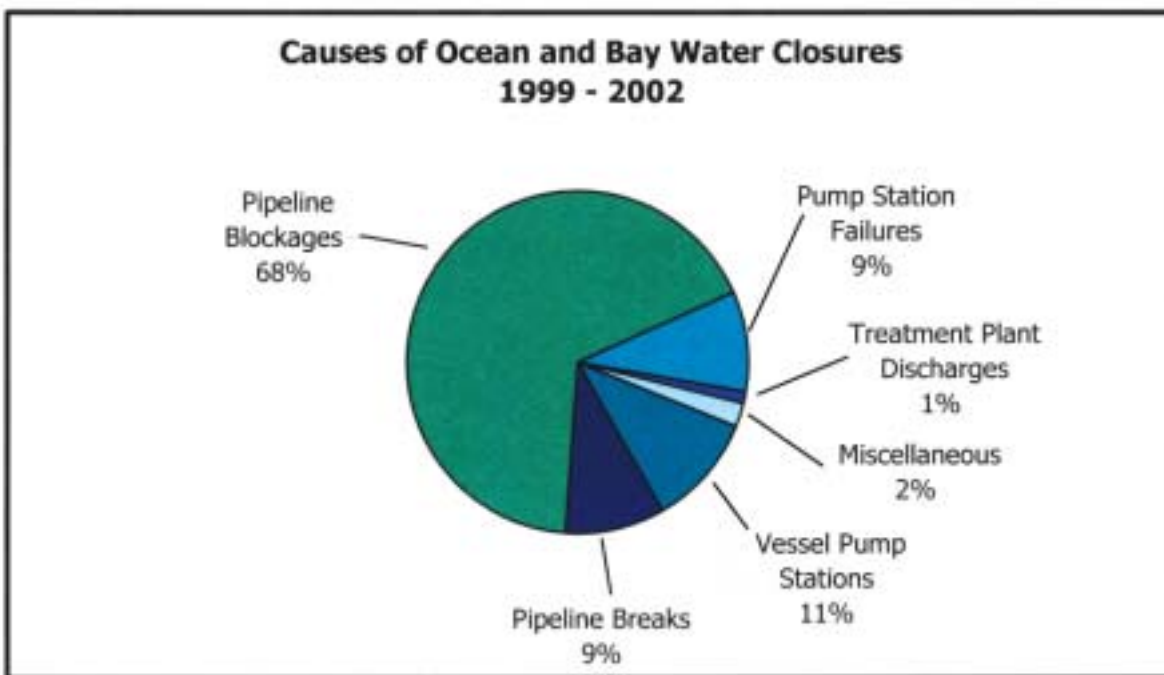


The percentage of ocean and bay water closures that were due to private property owner (e.g., apartment/condominium complexes, restaurants, vessel pump stations, etc.) sewage spills from 1999 – 2002 is shown in the following chart. In 2002, private property owners were responsible for a majority (54%) of the ocean and bay water closures in Orange County.

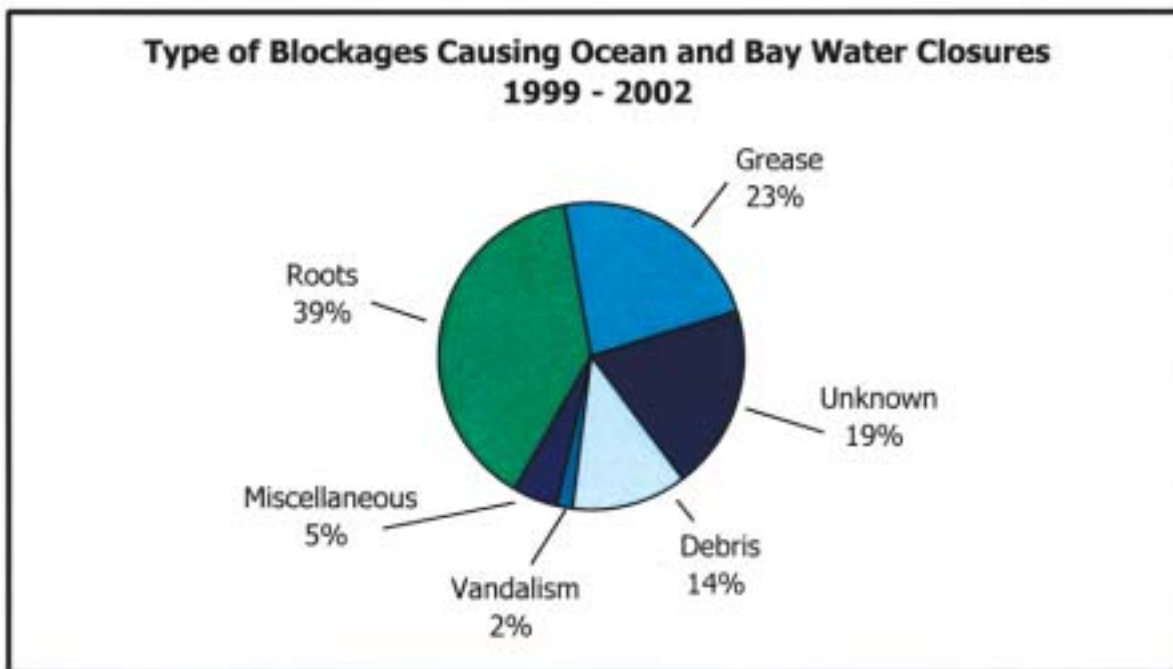


Sewage Spill Caused Ocean and Bay Water Closures 1999-2002 - continued

For 1999 – 2002, sewage pipeline blockages were responsible for a majority (68%) of the ocean and bay water closures in Orange County, as the following chart indicates.



The infiltration of roots and deposition of grease into sewer pipes accounted for a majority (62%) of the pipeline blockages that resulted in ocean and bay water closures in Orange County for 1999 – 2002, as the following chart indicates.



OCEAN AND BAY RAIN ADVISORIES 2000-2002

During and after a significant rainstorm event, storm drains, creeks and rivers carry floodwaters and urban runoff (which may include fertilizers, road oils, litter and large amounts of bacteria from a variety of sources such as animal waste and decomposing vegetation) to the ocean.

The level of bacteria can rise significantly in ocean and bay waters close to discharging storm drains and outlets of creeks, rivers and streams during and after rainstorms. To ensure that public health and safety is protected, the Ocean Water Protection Program staff advises against the use of water-contact sports areas where there may be contamination of ocean and bay waters due to storm runoff. The elevated bacterial levels in the coastal ocean waters may continue for a period of at least three days depending on the intensity of the rain and the volume of runoff. Swimmers should avoid Orange County coastal waters at this time and beach users should avoid contact with any runoff on the beach during dry or wet weather conditions.

A press release is issued during or after a rainstorm event of greater than or equal to two-tenths of an inch ($>0.20''$), unless multiple events occur during the 72-hour window of the previous rainstorm. In those cases, the existing rain advisory continues for an additional 72 hours. The Ocean and Bay Water Closure and Posting Hotline and Web Page are updated with the rain advisory information.

The dates listed below are the periods that an ocean and bay water rain advisory was in effect for Orange County during 2000 - 2002.

YEAR 2000 (55 Total Rain Advisory Days)

January 25 – February 2
February 10 – February 16
February 17 – February 27
February 28 – March 13
April 17 – April 23
September 23 – September 25
October 11 – October 15
October 27 – November 2

YEAR 2001 (74 Total Rain Advisory Days)

January 8 – January 16
January 24 – January 31
February 10 – February 16
February 20 – March 13
April 7 – April 13
April 21 – April 24
November 12 – November 16
November 24 – November 27
November 29 – December 6
December 14 – December 18
December 21 – December 25
December 30 – December 31

YEAR 2002 (44 Total Rain Advisory Days)

January 1 - January 3
January 28 – February 1
February 17 – February 21
March 7 – March 11
March 18 – March 21
March 23 – March 27
November 8 – November 13
November 30 – December 3
December 16 – December 31



OCEAN AND BAY WATER POSTINGS DUE TO WATER QUALITY STANDARDS VIOLATIONS

In July of 1999, when the Regulations for the AB 411 Ocean Water-Contact Sports Standards were promulgated, the Orange County Ocean Water Protection Program staff began posting the required health warning signs at public beaches where the ocean or bay waters failed to meet the bacteriological standards.

Bacteriological water samples are collected each week at approximately 150 ocean, bay and drainage locations throughout Orange County. The Ocean Water Protection Program staff review the results of 500-600 bacteriological water analyses each week to determine compliance with the nine standards. Results are reviewed on a daily basis to monitor compliance with standards.

When a bacteriological water sample fails to meet any of the AB 411 Ocean Water-Contact Sports Standards the following occurs:

- Warning signs are posted at the affected ocean or bay areas indicating that the waters have exceeded health standards.
- All the information regarding the posted areas is updated on the Ocean and Bay Water Closure and Posting Hotline and Web Page.
- Additional bacteriological water samples are collected at the posted areas and the results are evaluated daily to determine if the areas posted with warning signs should be increased, reduced, shifted or removed.

Because ocean or bay waters which violate the AB 411 Ocean Water-Contact Sports Standards may cause illness to users, the Orange County Health Care Agency recommends staying out of the water at all beach areas that are posted with the health warning sign shown below.



Postings for all Orange County Beach Areas 2000-2002 (April-October)

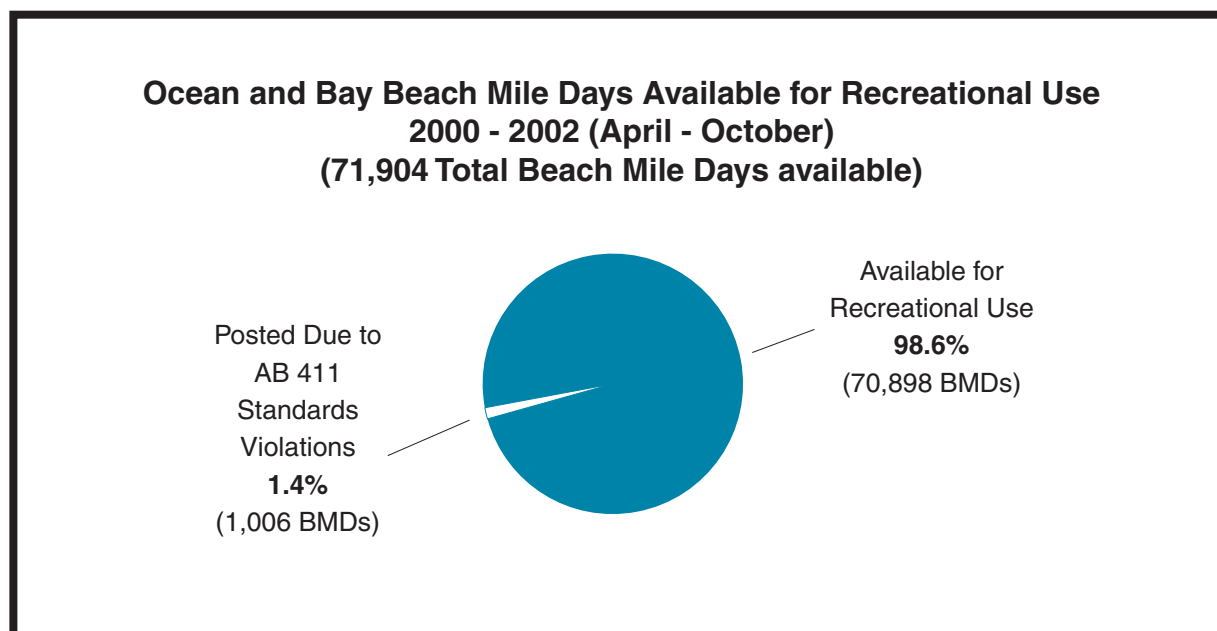
As required by the California Health and Safety Code Section 115910, violations of the AB 411 Ocean Water-Contact Sports Standards between April 1 and October 31 must be reported to the California State Water Resources Control Board by all California coastal counties on a monthly basis. The information provided in this section are the data reported to the California State Water Resources Control Board beginning with the year 2000, the first full calendar year that the AB 411 Ocean Water-Contact Sports Standards were in place.

The total number of postings, total number of days posted, and total number of Beach Mile Days posted due to violations of AB 411 standards between April 1 and October 31 for all Orange County beach areas are shown in the following table.

Year	Postings	Days	Beach Mile Days
2000	199	2,123	362.8
2001	202	2,150	279.3
2002	303	2,271	363.9

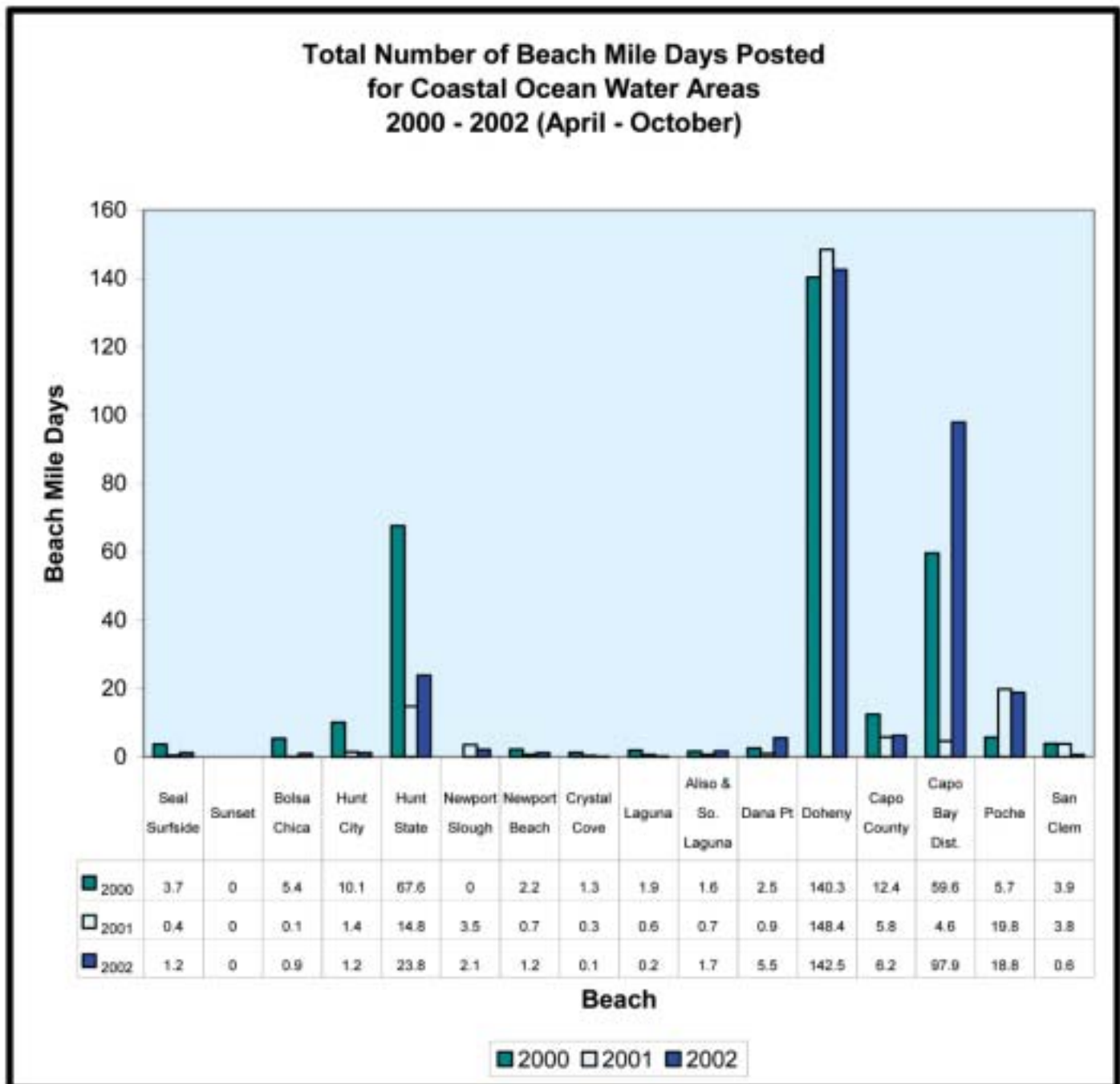
Note: this table does not include Newport Slough data because no samples were collected in 2000.

For 2000 – 2002, the total number of Beach Mile Days posted due to AB 411 standards violations between April 1 and October 31 represents a small percentage (1.4%) of the total number of Beach Mile Days available (71,904 BMD) for recreational water use during this period, as the following chart indicates.



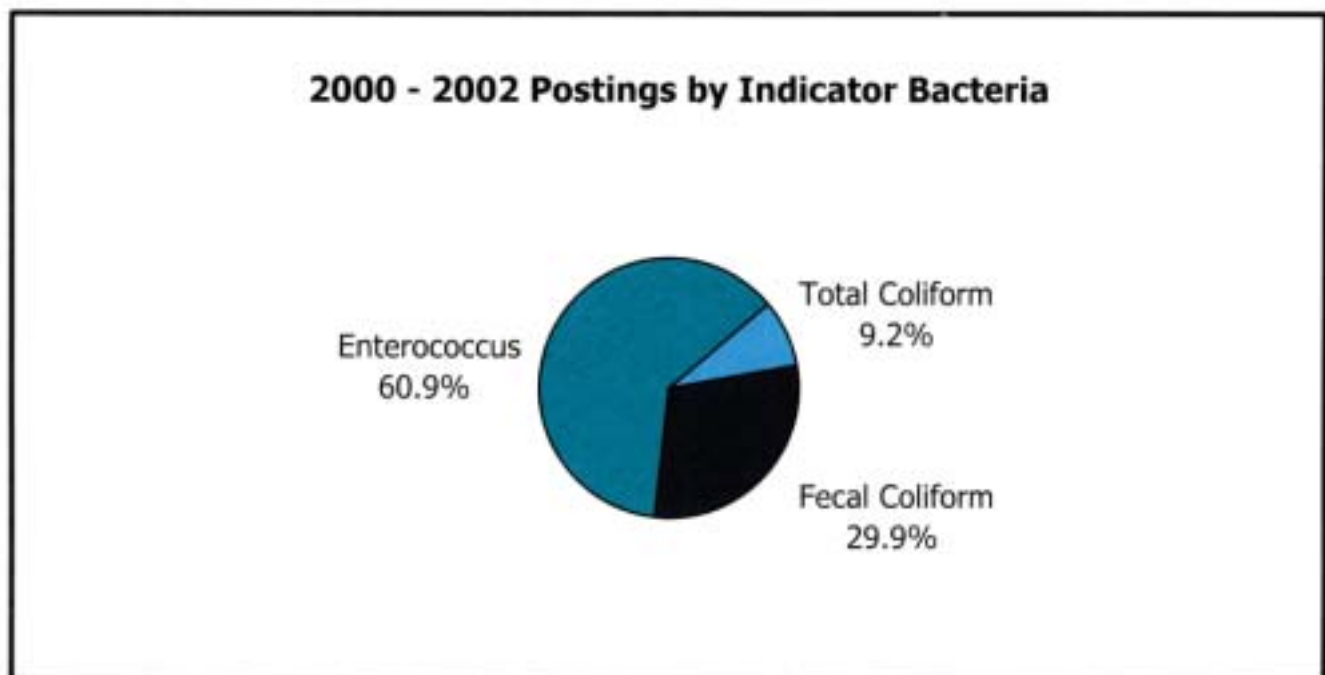
Postings for Coastal Oceans Water Areas 2000-2002 (April-October)

The total number of Beach Mile Days posted due to AB 411 standards violations between April 1 and October 31 for each Orange County coastal ocean water area from 2000 – 2002 is depicted in the following graph. The coastal ocean water areas of Doheny State Beach, Capistrano Bay District Beach and Huntington State Beach have the highest total number of Beach Mile Days posted from 2000 – 2002.



Postings by Indicator Bacteria 2000 - 2002 (April - October)

Violations of the single sample enterococcus standard accounted for a majority (60.9%) of the ocean and bay water postings that occurred in Orange County between April 1 and October 31 for 2000 – 2002.



Calendar Year Postings for all Orange County Beach Areas 2000-2002

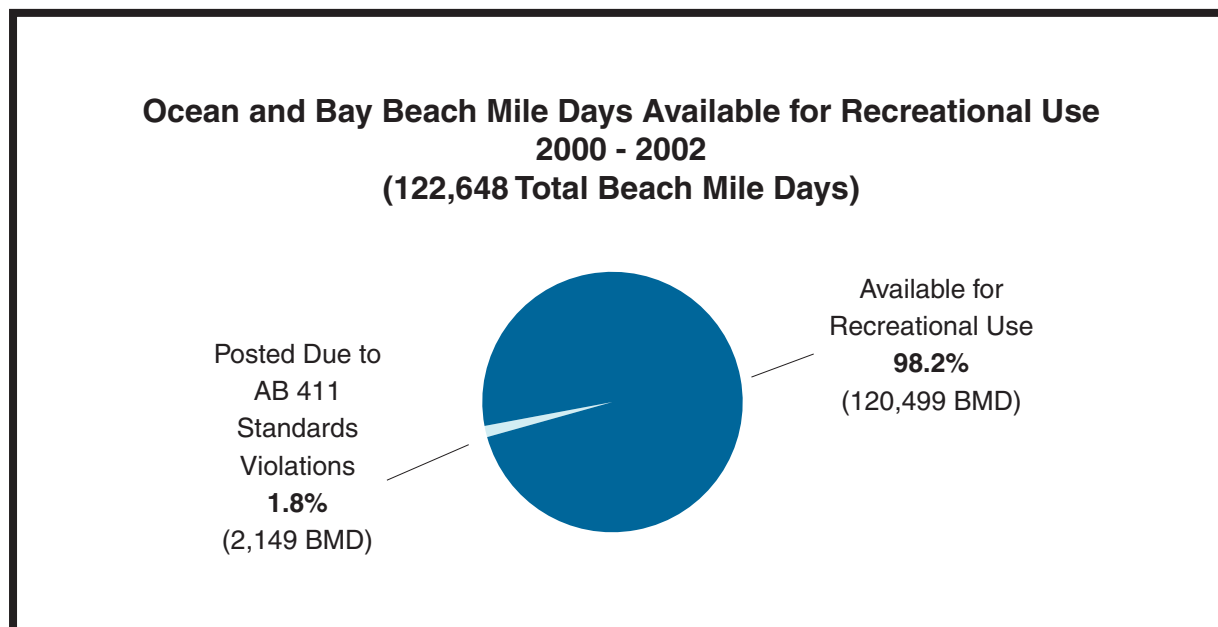
Due to year round recreational water use, Orange County conforms to Ocean Water-Contact Sports Standards on a continuous basis. Violations are reported to the California State Water Resources Control Board on a monthly basis with the exception of violations occurring when a rain advisory is in effect. The information provided in this section are the data reported to the California State Water Resources Control Board beginning with the year 2000, the first full calendar year that the AB 411 Ocean Water-Contact Sports Standards were in place.

The total number of postings, total number of days posted, and total number of Beach Mile Days posted due to violations of AB 411 standards between January 1 and December 31 for all Orange County beach areas are shown in the table below.

Year	Postings	Days	Beach Mile Days
2000	289	3,839	675.1
2001	312	4,292	711.7
2002	295	4,301	762.1

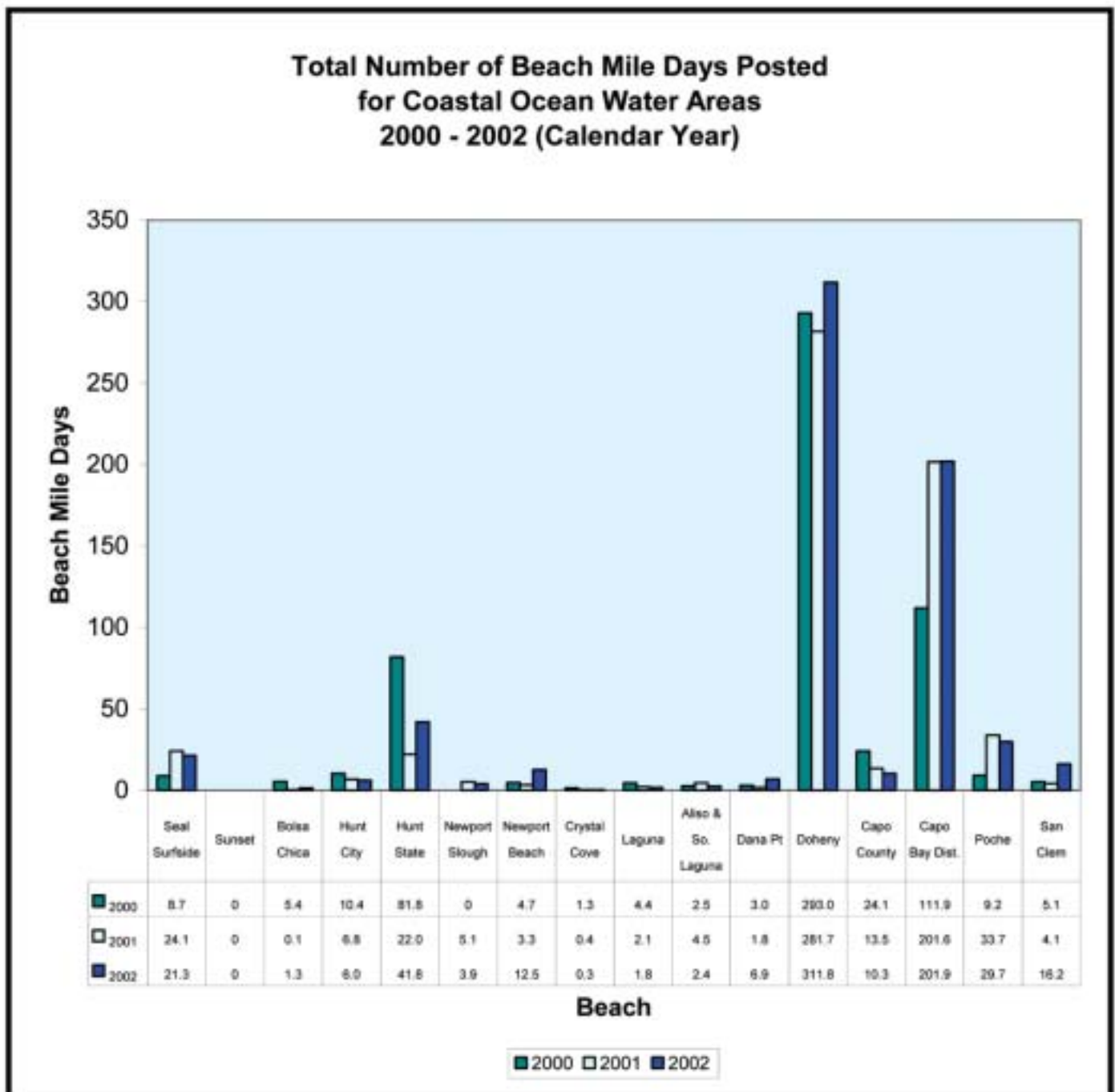
Note: this table does not include Newport Slough data because no samples were collected in 2000.

For 2000 – 2002, the total number of Beach Mile Days posted due to AB 411 standards violations between January 1 and December 31 represent a small percentage (1.8%) of the total number of Beach Mile Days available (122,648 BMD) for recreational water use during this period.



Calendar Year Postings for all Orange County Beach Areas 2000-2002

The total number of Beach Mile Days posted due to AB 411 standards violations for the calendar year at each Orange County coastal ocean water area from 2000 – 2002 is depicted in the following graph. The coastal ocean areas of Doheny State Beach, Capistrano Bay District Beach and Huntington State Beach have the highest total number of Beach Mile Days posted from 2000 – 2002.



APPENDIX 1

Postings by Beach Area 2000 – 2002

The following tables, arranged in geographical order, provide sample collection information for each Orange County beach area, and indicate the total number of postings, total number of days posted, and the total number of Beach Mile Days posted due to AB 411 standards violations between April 1 and October 31, and for the calendar year (dry weather data) for 2000 - 2002.

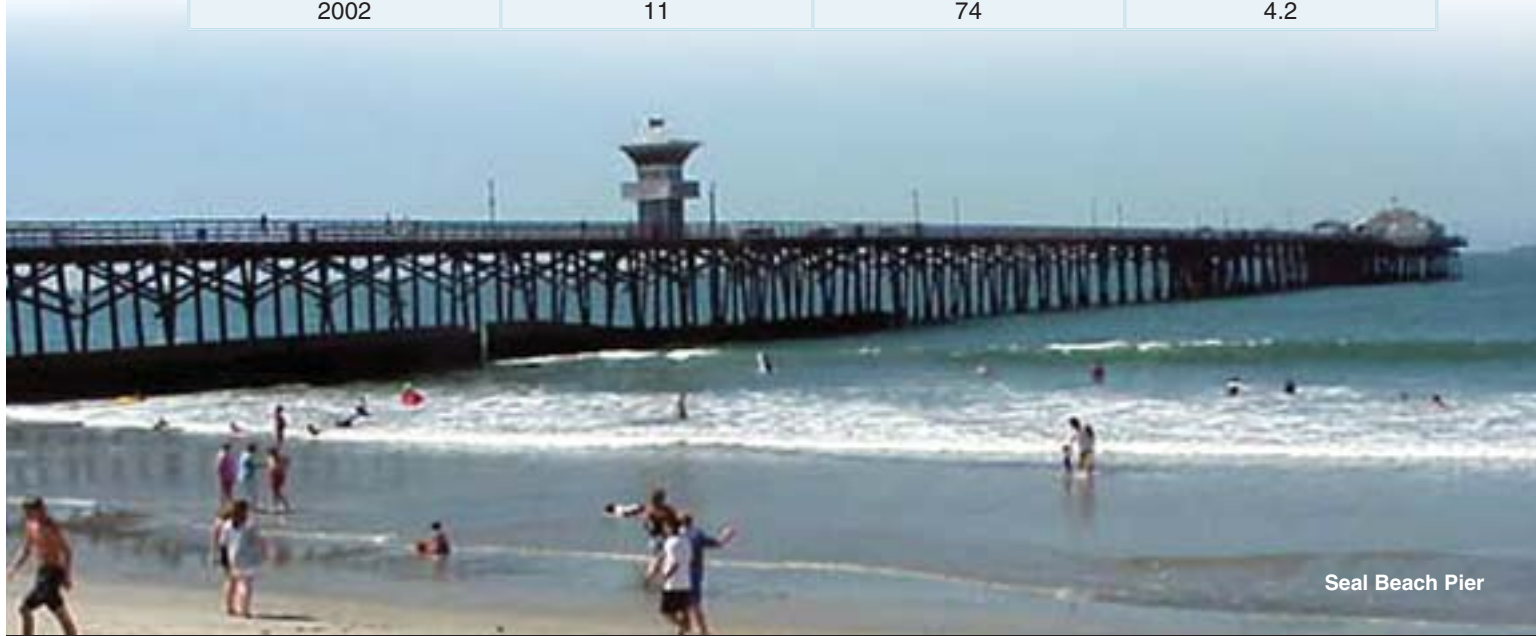
The beach areas and data included in this section are consistent with the information provided to the California State Water Resources Control Board as required by Section 115910 of the California Health and Safety Code.

• SEAL BEACH / SURFSIDE

Sampling Agency:	Orange County Environmental Health
Sampling Frequency:	1 sample per week
Sampling Stations:	5
Sampling Locations:	1st Street, 8th Street, South of Pier, 14th Street, Sea Way
Beach Miles:	2 miles of coastal beach
Available AB411 BMDs:	428 BMDs
Available Yearly BMDs:	730 BMDs

AB 411 PERIOD (APRIL – OCTOBER)			
Year	Postings	Days	Beach Mile Days
2000	6	47	3.7
2001	3	6	0.4
2002	5	22	1.2

CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days
2000	8	109	14.4
2001	10	57	11.4
2002	11	74	4.2



Seal Beach Pier

Appendix 1 - continued

• SUNSET BEACH

Sampling Agency: Orange County Environmental Health
Sampling Frequency: 1 sample per week
Sampling Stations: 1
Sampling Locations: Broadway
Beach Miles: 1 mile of coastal beach
Available AB411 BMDs: 214 BMDs
Available Yearly BMDs: 365 BMDs

AB 411 PERIOD (APRIL – OCTOBER)

Year	Postings	Days	Beach Mile Days
2000	0	0	0
2001	0	0	0
2002	0	0	0

CALENDAR YEAR

Year	Postings	Days	Beach Mile Days
2000	0	0	0
2001	0	0	0
2002	0	0	0

• BOLSA CHICA STATE BEACH

Sampling Agency: Orange County Sanitation District
Sampling Frequency: 3-5 per week (season dependent)
Sampling Stations: 2
Sampling Locations: Bolsa Chica Reserve, Bolsa Chica Beach
Beach Miles: 2.8 miles of coastal beach
Available AB411 BMDs: 599.2 BMDs
Available Yearly BMDs: 1,022 BMDs

AB 411 PERIOD (APRIL – OCTOBER)

Year	Postings	Days	Beach Mile Days
2000	6	12	5.4
2001	1	1	0.1
2002	7	11	0.9

CALENDAR YEAR

Year	Postings	Days	Beach Mile Days
2000	6	12	5.4
2001	1	1	0.1
2002	10	16	1.3

Appendix 1 - continued

• HUNTINGTON HARBOUR

Sampling Agency:	Orange County Environmental Health
Sampling Frequency:	1 sample per week
Sampling Stations:	13
Sampling Locations:	Sunset Aquatic Marina, Mother's Beach, Trinidad Lane Beach, Sea Gate, Humbolt Beach, Davenport Beach, Clubhouse Marina, Harbour Channel, 11th Street Beach, Admiralty Drive, Anderson Street Marina, Anaheim Bay Gas Dock, Coral Cay Beach
Beach Miles:	31.1 miles of harbor
Available AB411 BMDs:	6,655.4 BMDs
Available Yearly BMDs:	11,351.5 BMDs

AB 411 PERIOD (APRIL – OCTOBER)			
Year	Postings	Days	Beach Mile Days
2000	16	100	4.7
2001	34	182	18.0
2002	24	134	7.3

CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days
2000	27	196	8.7
2001	56	492	24.1
2002	43	394	21.3



Coral Cay Beach, Huntington Harbour

Appendix 1 - continued

• HUNTINGTON CITY BEACH

Sampling Agency: Orange County Sanitation District
Sampling Frequency: 3-5 per week (season dependent)
Sampling Stations: 4
Sampling Locations: Bluffs, 17th Street, Jack's Snack Bar, Beach Blvd.
Beach Miles: 3.5 miles of coastal beach
Available AB411 BMDs: 749 BMDs
Available Yearly BMDs: 1,277.5 BMDs

AB 411 PERIOD (APRIL – OCTOBER)			
Year	Postings	Days	Beach Mile Days
2000	6	10	10.1
2001	10	16	1.4
2002	7	14	1.2

CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days
2000	9	16	10.4
2001	14	24	6.8
2002	21	33	6.0

• HUNTINGTON STATE BEACH

Sampling Agency: Orange County Sanitation District
Sampling Frequency: 3-5 per week (season dependent)
Sampling Stations: 5
Sampling Locations: Beach Blvd., Newland Street, Magnolia Street, Brookhurst Street, Santa Ana River Mouth Beach
Beach Miles: 2.5 miles of coastal beach
Available AB411 BMDs: 535 BMDs
Available Yearly BMDs: 912.5 BMDs

AB 411 PERIOD (APRIL – OCTOBER)			
Year	Postings	Days	Beach Mile Days
2000	28	223	67.6
2001	29	70	14.8
2002	31	89	23.8

CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days
2000	36	255	81.8
2001	38	119	22.0
2002	42	158	41.8

Appendix 1 - continued

• NEWPORT SLOUGH

Sampling Agency: Orange County Environmental Health
 Sampling Frequency: 1 sample per week
 Sampling Stations: 2
 Sampling Locations: Lancaster Street Beach, Grant Street Channel
 Beach Miles: 0.1 miles of channel beach
 Available AB411 BMDs: 21.4 BMDs
 Available Yearly BMDs: 36.5 BMDs

AB 411 PERIOD (APRIL – OCTOBER)			
Year	Postings	Days	Beach Mile Days
2000	N/A	N/A	N/A
2001	6	324	3.5
2002	5	181	2.1

CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days
2000	N/A	N/A	N/A
2001	9	381	5.1
2002	13	339	3.9



Santa Ana River & Newport Slough, Newport Beach

Appendix 1 - continued

• NEWPORT BAY

Sampling Agency:	Orange County Environmental Health
Sampling Frequency:	1 sample per week
Sampling Stations:	31
Sampling Locations:	Newport Dunes (East, Middle, West, and North), Vaughn's Launch, Ski Zone, North Star Beach, Bayshore Beach, De Anza, 43rd Street, 38th Street, 33rd Street, Newport Blvd. Bridge, Lido Yacht Club Beach, Via Genoa Beach, Rhine Channel, 19th Street Beach, 15th Street Beach, 10th Street Beach, Alvarado/Bay Isle Beach, N Street Beach, Garnet Avenue Beach, Ruby Avenue Beach, Sapphire Avenue Beach, Grand Canal, Abalone Avenue Beach, Park Avenue Beach, Onyx Avenue Beach, Promontory Point Channel, Harbor Patrol Beach, Rocky Point Beach
Beach Miles:	39.5 miles of bay front
Available AB411 BMDs:	8,453 BMDs
Available Yearly BMDs:	14,417.5 BMDs

AB 411 PERIOD (APRIL – OCTOBER)			
Year	Postings	Days	Beach Mile Days
2000	56	929	32.0
2001	68	931	39.0
2002	43	905	35.6

CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days
2000	75	1483	64.0
2001	94	1663	67.7
2002	61	1514	58.4



Appendix 1 - continued

• NEWPORT BEACH

Sampling Agency:	Orange County Sanitation District, Orange County Environmental Health
Sampling Frequency:	1-5 per week (agency and season dependent)
Sampling Stations:	9
Sampling Locations:	Orange Street, 52nd/53rd Street, 38th Street, Newport Pier, 15th/16th Street, Balboa Pier, The Wedge, Corona Del Mar State Beach, Little Corona
Beach Miles:	7 miles of coastal beach
Available AB411 BMDs:	1,498 BMDs
Available Yearly BMDs:	2,555 BMDs

AB 411 PERIOD (APRIL – OCTOBER)			
Year	Postings	Days	Beach Mile Days
2000	8	18	2.2
2001	8	13	0.7
2002	10	17	1.2

CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days
2000	15	33	4.7
2001	23	49	3.3
2002	22	64	12.5



Newport Beach

Appendix 1 - continued

• CRYSTAL COVE STATE PARK

Sampling Agency: Orange County Environmental Health, Orange County Sanitation District
 Sampling Frequency: 1-5 samples per week (agency and season dependent)
 Sampling Stations: 4
 Sampling Locations: Pelican Point, Crystal Cove, Muddy Creek Beach, El Morro Beach
 Beach Miles: 3.2 miles of coastal beach
 Available AB411 BMDs: 684.8 BMDs
 Available Yearly BMDs: 1,168 BMDs

AB 411 PERIOD (APRIL – OCTOBER)			
Year	Postings	Days	Beach Mile Days
2000	9	21	1.3
2001	3	5	0.3
2002	1	1	0.1

CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days
2000	9	21	1.3
2001	4	7	0.4
2002	3	6	0.3

• LAGUNA BEACH

Sampling Agency: Orange County Environmental Health, South Orange County Wastewater Authority
 Sampling Frequency: 1-2 per week (agency dependent)
 Sampling Stations: 7
 Sampling Locations: Emerald Bay, Crescent Bay, Laguna Main Beach, Hotel Laguna, Bluebird Canyon, Victoria Beach, Blue Lagoon
 Beach Miles: 4.4 miles of coastal beach
 Available AB411 BMDs: 941.6 BMDs
 Available Yearly BMDs: 1,606 BMDs

AB 411 PERIOD (APRIL – OCTOBER)			
Year	Postings	Days	Beach Mile Days
2000	15	34	1.9
2001	5	10	0.6
2002	3	4	0.2

CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days
2000	26	65	4.4
2001	14	35	2.1
2002	8	31	1.8

Appendix 1 - continued

• ALISO BEACH & SOUTH LAGUNA BEACH

Sampling Agency:	South Orange County Wastewater Authority
Sampling Frequency:	2 samples per week
Sampling Stations:	11
Sampling Locations:	Treasure Island Pier, Treasure Island Sign, Aliso-North, Aliso-Middle, Aliso Midpoint between Middle & South Stations, Aliso-South, Camel Point, Table Rock, Laguna Lido, 9th Street/1000 Steps Beach, Three Arch Bay
Beach Miles:	2 miles of coastal beach
Available AB411 BMDs:	428 BMDs
Available Yearly BMDs:	730 BMDs

AB 411 PERIOD (APRIL – OCTOBER)			
Year	Postings	Days	Beach Mile Days
2000	12	22	1.6
2001	4	5	0.7
2002	4	9	1.7

CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days
2000	20	37	2.5
2001	10	22	4.5
2002	7	14	2.4

• DANA POINT

Sampling Agency:	Orange County Environmental Health, South Orange County Wastewater Authority
Sampling Frequency:	1-2 samples per week (agency and season dependent)
Sampling Stations:	5
Sampling Locations:	Monarch Beach - North, Monarch Beach - South, Salt Creek Beach, Dana Strands, Ocean Institute Beach
Beach Miles:	3 miles of coastal beach
Available AB411 BMDs:	642 BMDs
Available Yearly BMDs:	1,095 BMDs

AB 411 PERIOD (APRIL – OCTOBER)			
Year	Postings	Days	Beach Mile Days
2000	4	42	2.5
2001	7	13	0.9
2002	10	95	5.5

CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days
2000	8	53	3.0
2001	12	31	1.8
2002	11	119	6.9

Appendix 1 - continued

• DANA POINT HARBOR

Sampling Agency:	Orange County Environmental Health, South Orange County Wastewater Authority
Sampling Frequency:	1-2 samples per week (agency and season dependent)
Sampling Stations:	11
Sampling Locations:	Fuel Dock, Baby Beach (West End, Buoy Line, Swim Area, East End), Pier, Pilgrim Dock, Youth Dock, Harbor Entrance, Guest Dock, Harbor Patrol Dock
Beach Miles:	3.3 miles of harbor
Available AB411 BMDs:	706.2 BMDs
Available Yearly BMDs:	1,204.5 BMDs

AB 411 PERIOD (APRIL – OCTOBER)			
Year	Postings	Days	Beach Mile Days
2000	10	206	7.9
2001	8	420	20.0
2002	9	410	19.2

CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days
2000	12	697	31.2
2001	13	740	32.9
2002	11	719	35.3



Baby Beach, Dana Point Harbor, Dana Point

Appendix 1 - continued

• DOHENY STATE BEACH

Sampling Agency:	South Orange County Wastewater Authority, Orange County Environmental Health
Sampling Frequency:	1-2 samples per week (agency and season dependent)
Sampling Stations:	8
Sampling Locations:	North Beach, 250' North of San Juan Creek, San Juan Creek/Ocean Interface, 250' South of San Juan Creek, 1000' South of Outfall, 2000' South of Outfall, 3000' South of Outfall, 4000' South of Outfall
Beach Miles:	1.1 miles of coastal beach
Available AB411 BMDs:	235.4 BMDs
Available Yearly BMDs:	401.5 BMDs

AB 411 PERIOD (APRIL – OCTOBER)			
Year	Postings	Days	Beach Mile Days
2000	9	165	140.3
2001	5	191	148.4
2002	7	216	142.5

CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days
2000	11	319	293.0
2001	6	368	281.7
2002	7	367	311.8



San Juan Creek Mouth at
Doheny State Beach, Dana Point

Appendix 1 - continued

• CAPISTRANO COUNTY BEACH

Sampling Agency: South Orange County Wastewater Authority, Orange County Environmental Health
Sampling Frequency: 1-2 per week (season dependent)
Sampling Stations: 1
Sampling Locations: Capistrano County Beach
Beach Miles: 0.25 miles of coastal beach
Available AB411 BMDs: 53.5 BMDs
Available Yearly BMDs: 91.25 BMDs

AB 411 PERIOD (APRIL – OCTOBER)			
Year	Postings	Days	Beach Mile Days
2000	4	128	12.4
2001	5	98	5.8
2002	7	104	6.2

CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days
2000	6	248	24.1
2001	7	238	13.5
2002	8	242	10.3

CAPISTRANO BAY DISTRICT BEACH

Sampling Agency: South Orange County Wastewater Authority, Orange County Environmental Health
Sampling Frequency: 1-2 per week (season dependent)
Sampling Stations: 2
Sampling Locations: 7500' South of Outfall, 10,000' South of Outfall
Beach Miles: 1.6 miles of coastal beach
Available AB411 BMDs: 342.4 BMDs
Available Yearly BMDs: 584 BMDs

AB 411 PERIOD (APRIL – OCTOBER)			
Year	Postings	Days	Beach Mile Days
2000	2	53	50.6
2001	5	31	4.6
2002	6	77	97.9

CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days
2000	7	107	111.9
2001	7	131	201.6
2002	10	181	201.9

Appendix 1 - continued

• POCHE BEACH

Sampling Agency: South Orange County Wastewater Authority, Orange County Environmental Health
Sampling Frequency: 1-2 per week (season dependent)
Sampling Stations: 1
Sampling Locations: Poche Beach
Beach Miles: 0.2 miles of coastal beach
Available AB411 BMDs: 42.8 BMDs
Available Yearly BMDs: 73 BMDs

AB 411 PERIOD (APRIL – OCTOBER)			
Year	Postings	Days	Beach Mile Days
2000	3	104	5.7
2001	3	145	19.8
2002	4	153	18.8

CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days
2000	5	163	9.2
2001	3	298	33.7
2002	6	222	29.7



Appendix 1 - continued

• SAN CLEMENTE CITY & STATE BEACH

Sampling Agency:	South Orange County Wastewater Authority, Orange County Environmental Health
Sampling Frequency:	1-2 per week (season dependent)
Sampling Stations:	5
Sampling Locations:	North Beach, 450 Feet North of Pier, Trafalgar Street ("T" Street), Avenida Calafia, Avenida de Las Palmeras
Beach Miles:	1.4 miles of coastal beach
Available AB411 BMDs:	299.6 BMDs
Available Yearly BMDs:	511 BMDs

AB 411 PERIOD (APRIL – OCTOBER)			
Year	Postings	Days	Beach Mile Days
2000	5	13	3.9
2001	4	13	3.8
2002	6	10	0.6

CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days
2000	9	25	5.1
2001	5	17	4.1
2002	14	147	16.2



San Clemente City Beach

APPENDIX 2

30-Day Running Geometric Means for Selected Stations 2000 - 2002 (April – October)

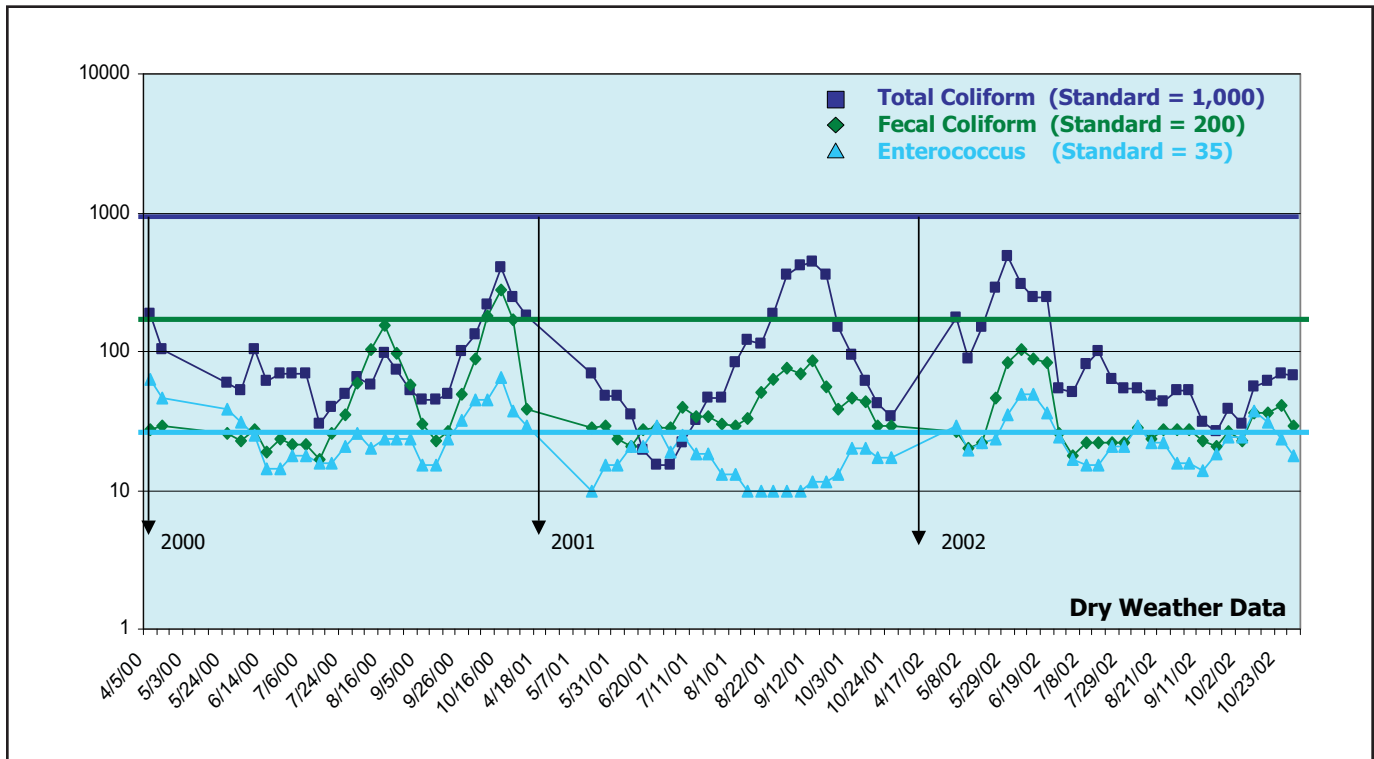
The following graphs, arranged by geographical location, provide the 30-day running geometric means at selected stations for total coliforms, fecal coliforms and enterococci between April 1 and October 31 during 2000 - 2002. Data representing rain advisory periods are omitted from this analysis. Running geometric means (which include at least 5 samples within the preceding 30 days) are used in addition to single sample results to detect exceedences under AB 411 Ocean Water-Contact Sports Standards. Running geometric means are useful in providing water quality data indicative of the trend at a given monitoring site without the influence of occasional, temporary single sample spikes in indicator levels.

The selected stations are representative of ocean and bay areas typically used for recreational activities and which are frequently posted, as well as comparison stations in the vicinity with minimal water quality postings. Each station is represented by a single graph depicting the relative levels of total coliforms, fecal coliforms and enterococci, together with the standard for each indicator. The lower limit for each indicator is determined by the limit of detection for the analytical laboratory, and is less than 10 CFU/100 ml for some stations. Vertical lines on the graphs separate annual AB 411 periods by year. Each running mean is represented by a continuous line and is not carried forward to subsequent years.



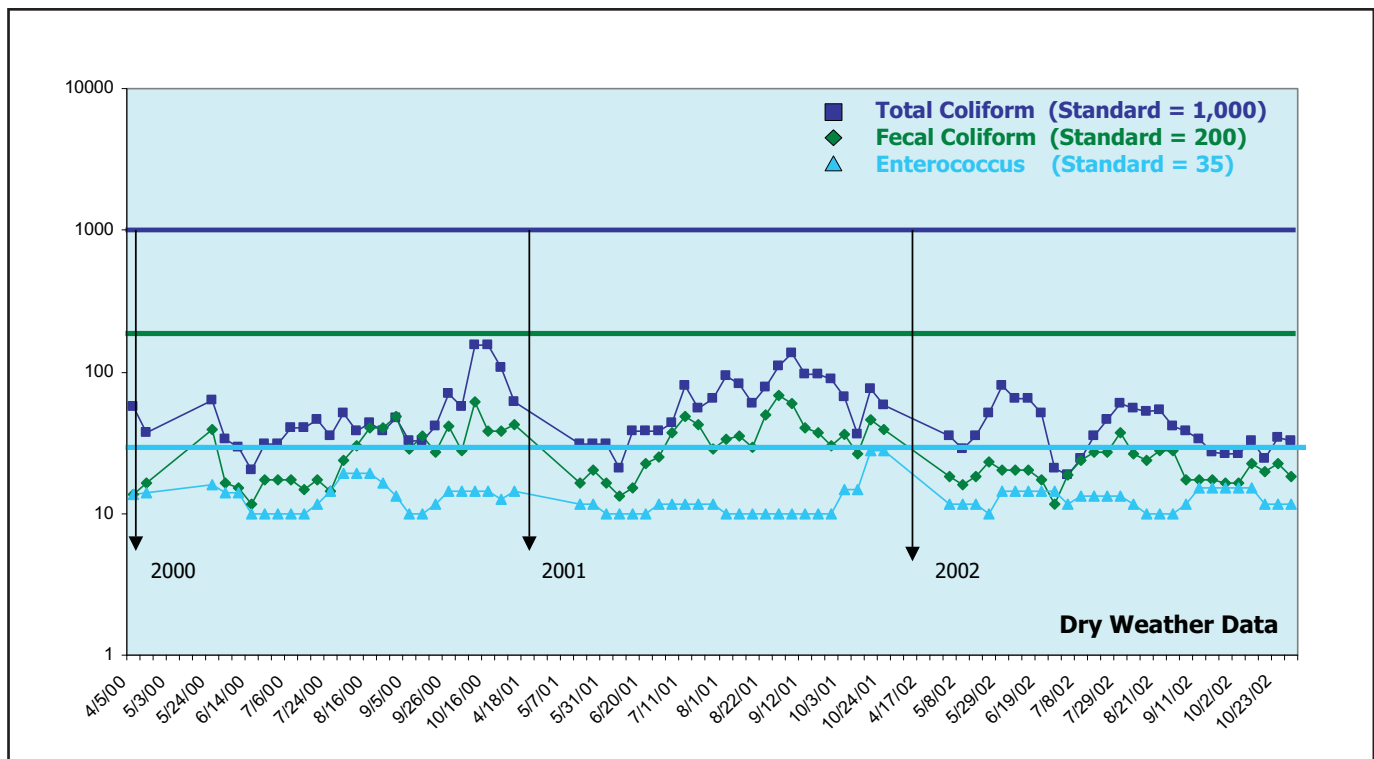
Seal Beach - 1st Street

Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus AB 411 Periods (4/1 through 10/31), 2000-2002



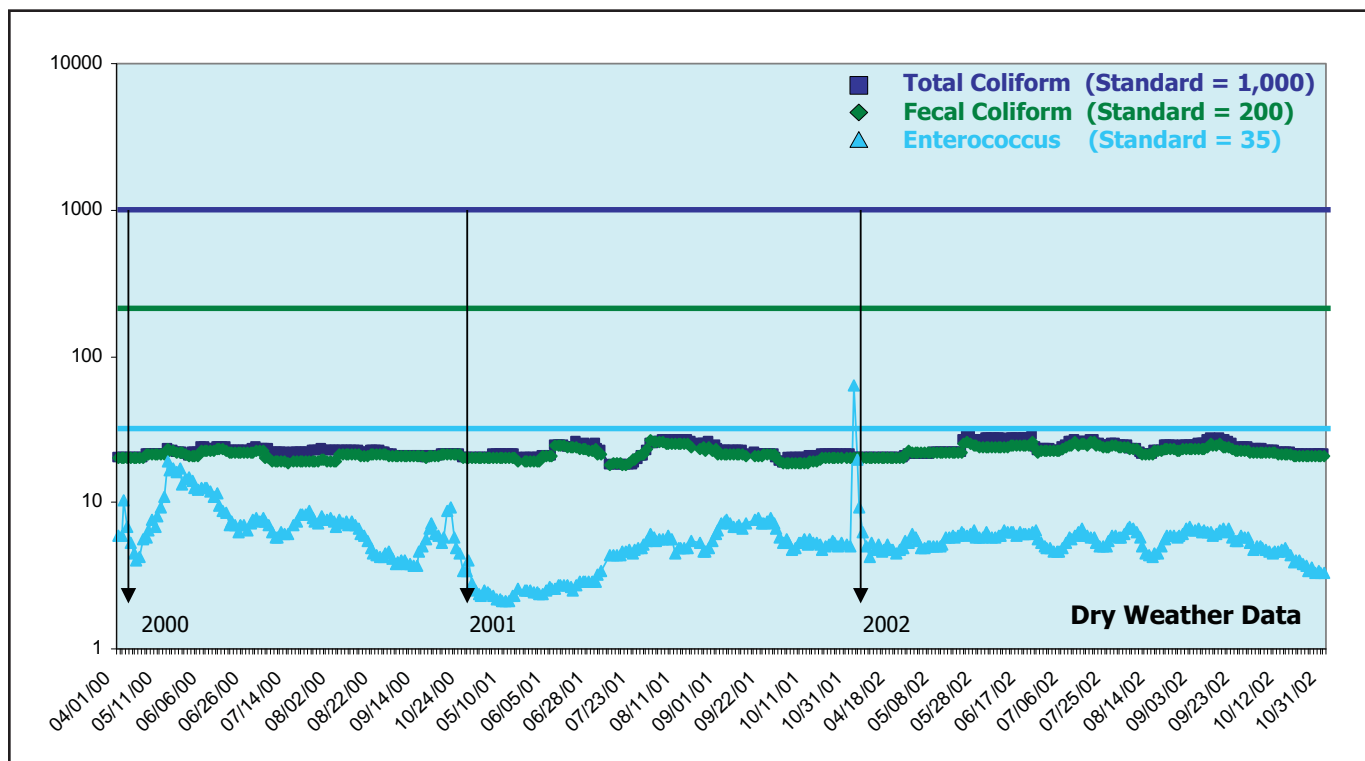
Seal Beach - 8th Street

Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus AB 411 Periods (4/1 through 10/31), 2000-2002



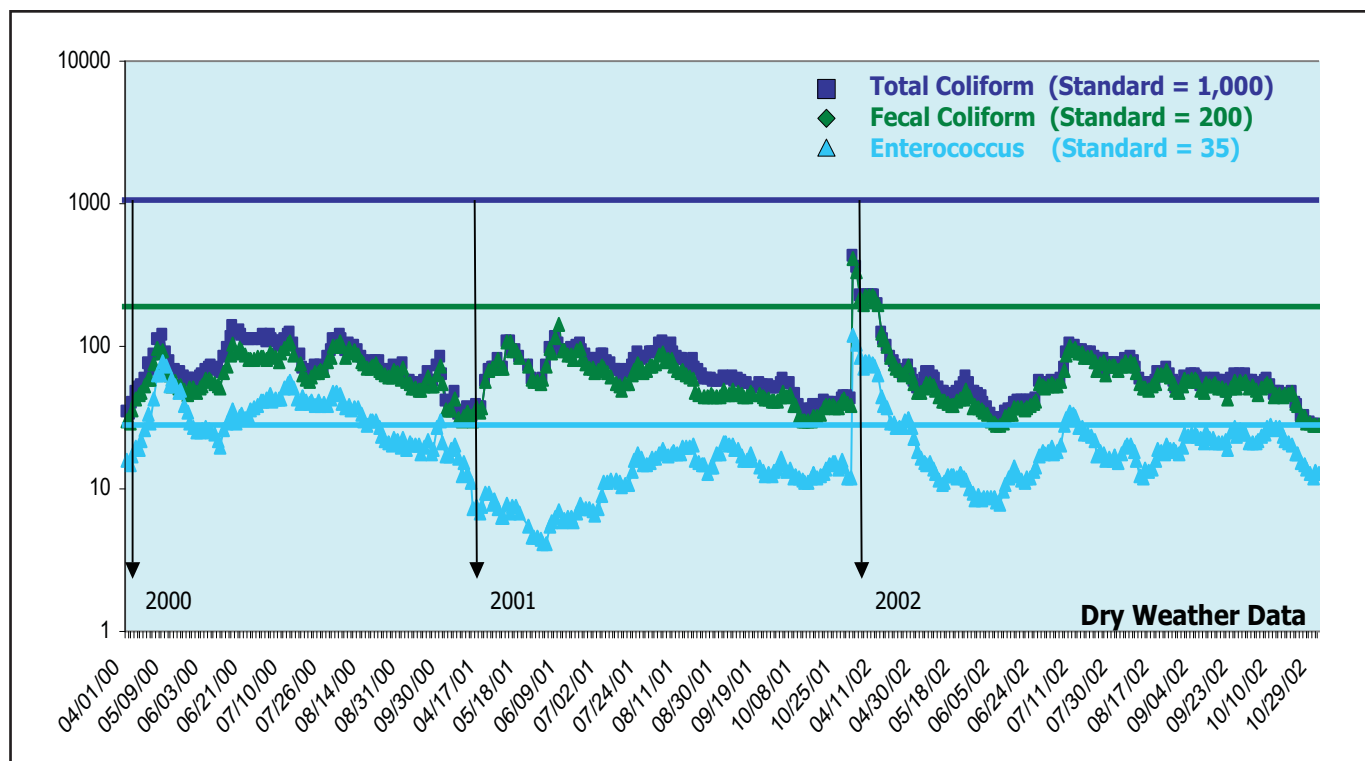
Huntington City Beach - Station 21N (17th Street)

Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus AB 411 Periods (4/1 through 10/31), 2000-2002

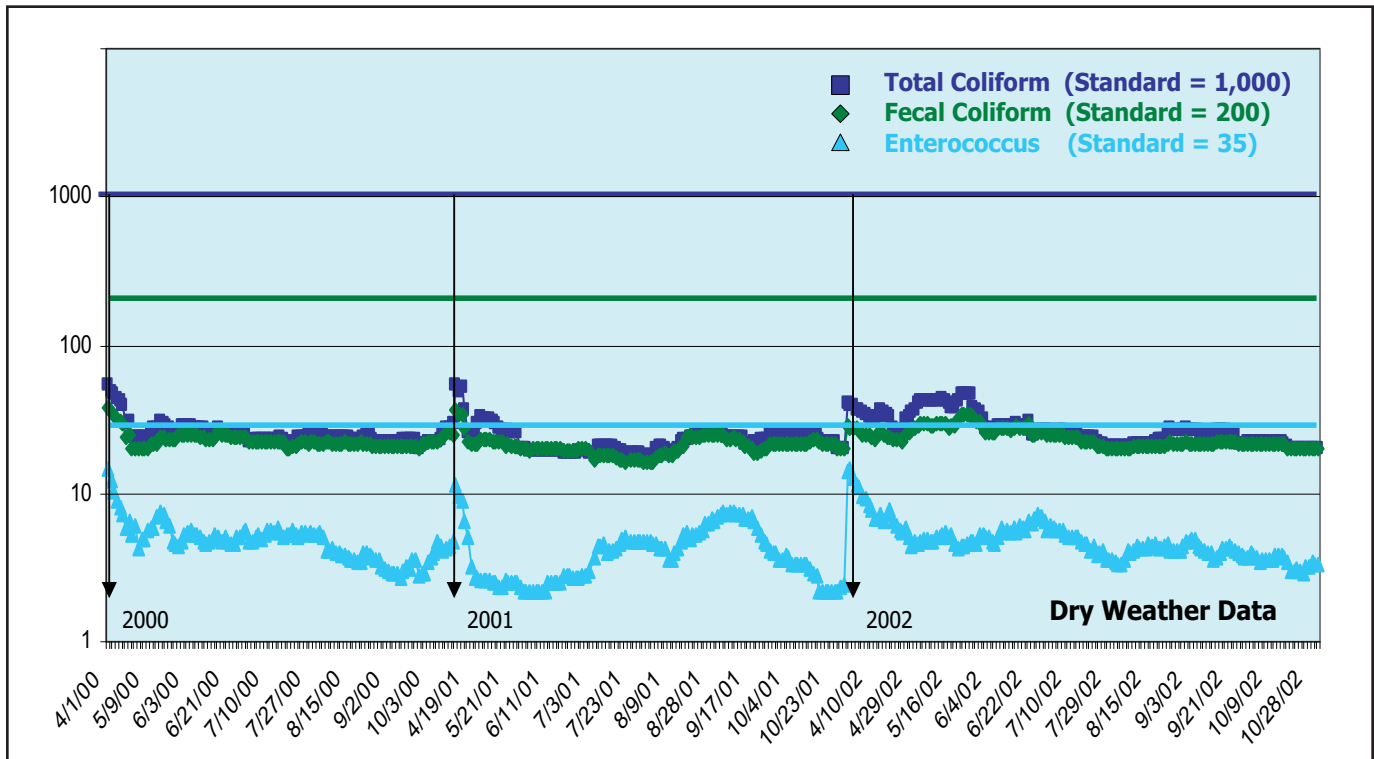


Huntington State Beach - Station 6N (Magnolia Street)

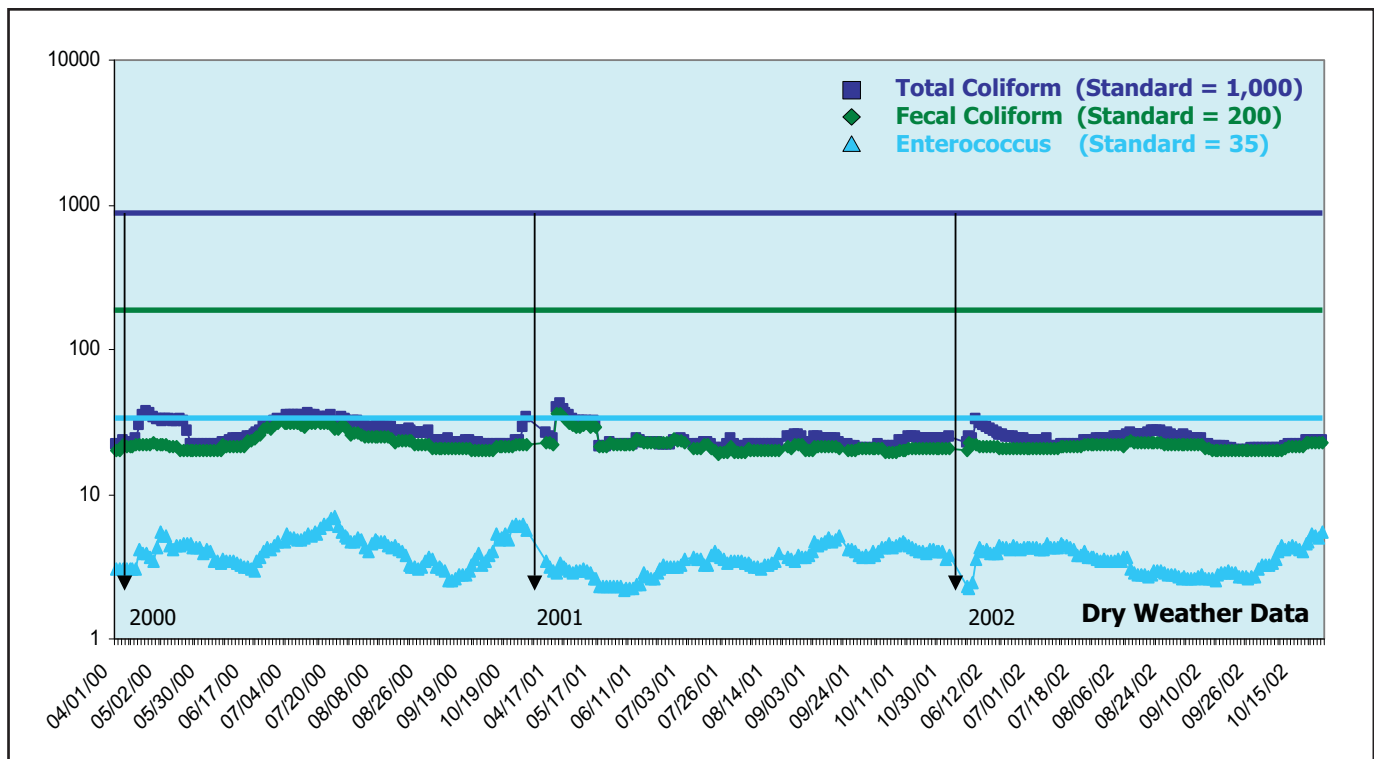
Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus AB 411 Periods (4/1 through 10/31), 2000-2002



Newport Beach - Station 3S (Orange Street)
Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus
AB 411 Periods (4/1 through 10/31), 2000-2002

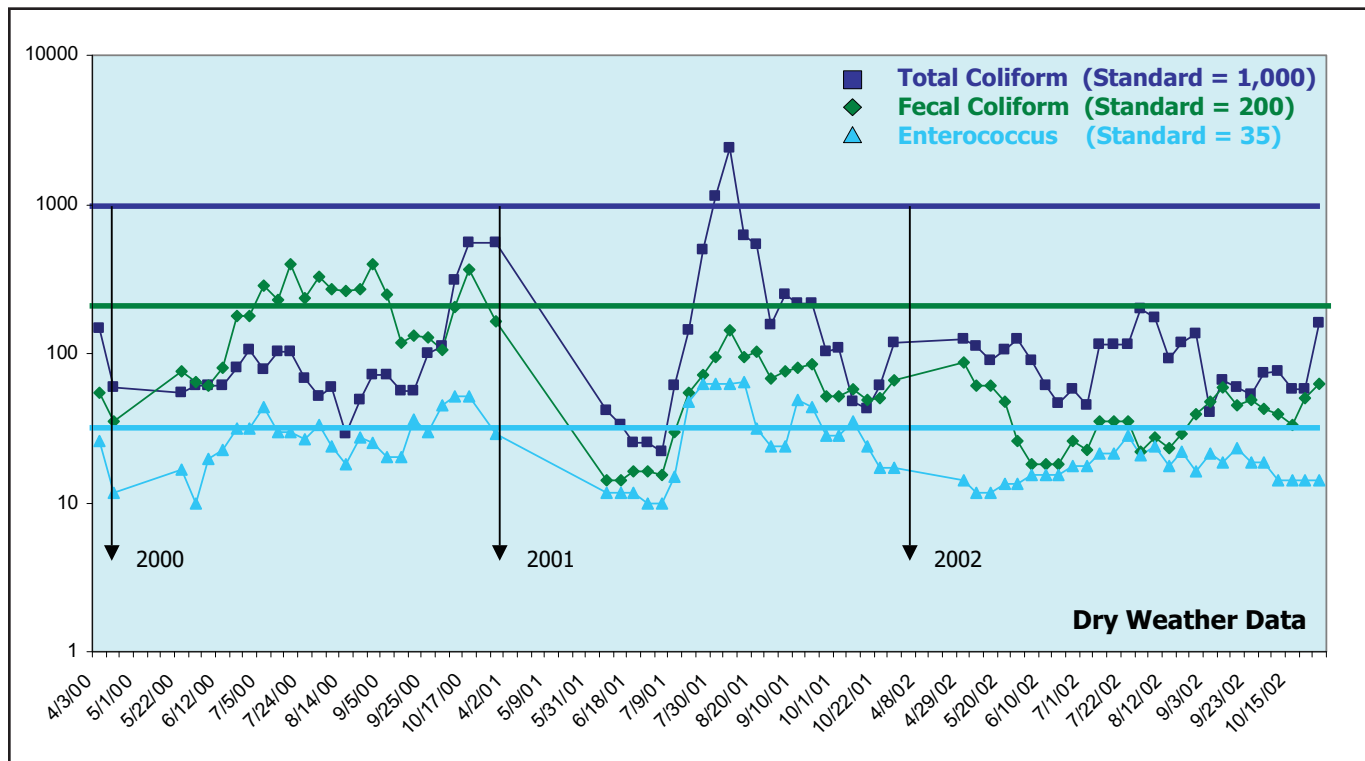


Newport Beach - Balboa Pier
Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus
AB 411 Periods (4/1 through 10/31), 2000-2002



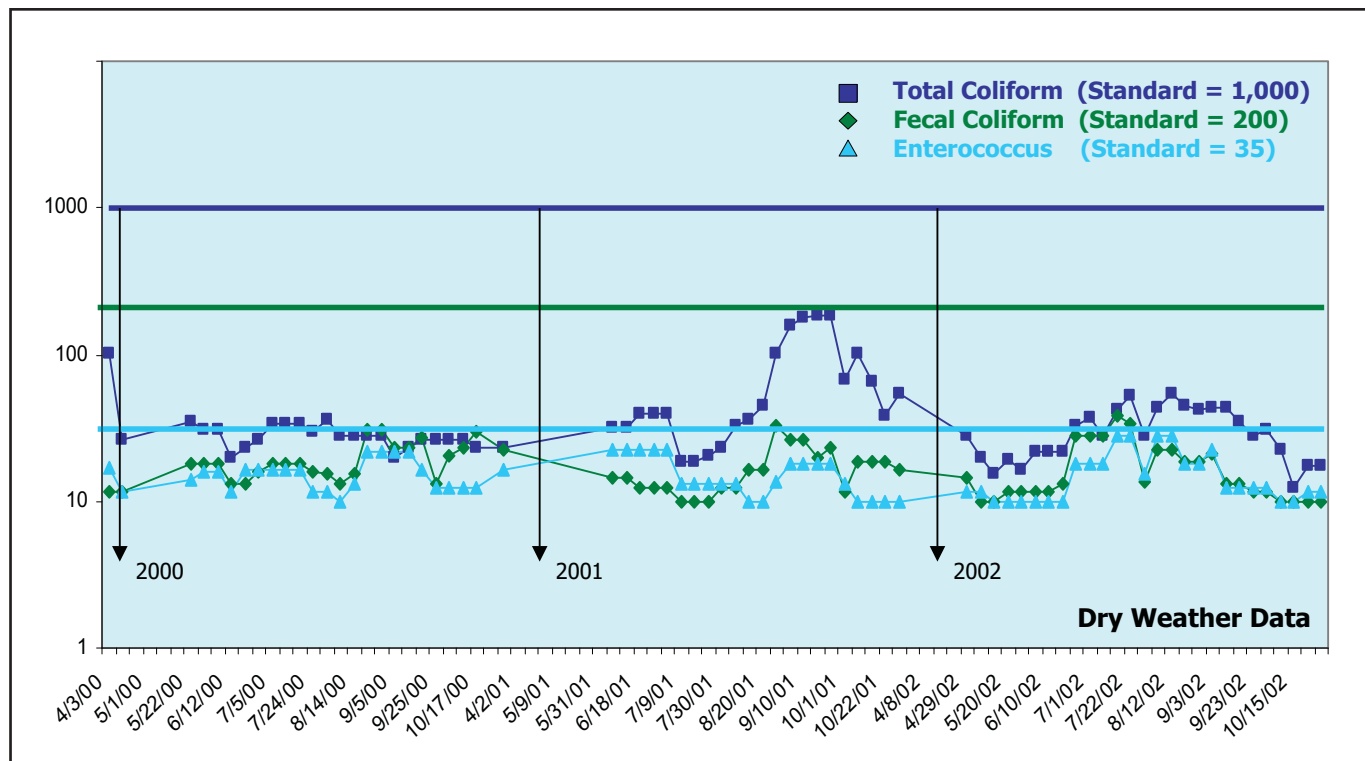
Newport Bay - Newport Dunes North

Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus AB 411 Periods (4/1 through 10/31), 2000-2002

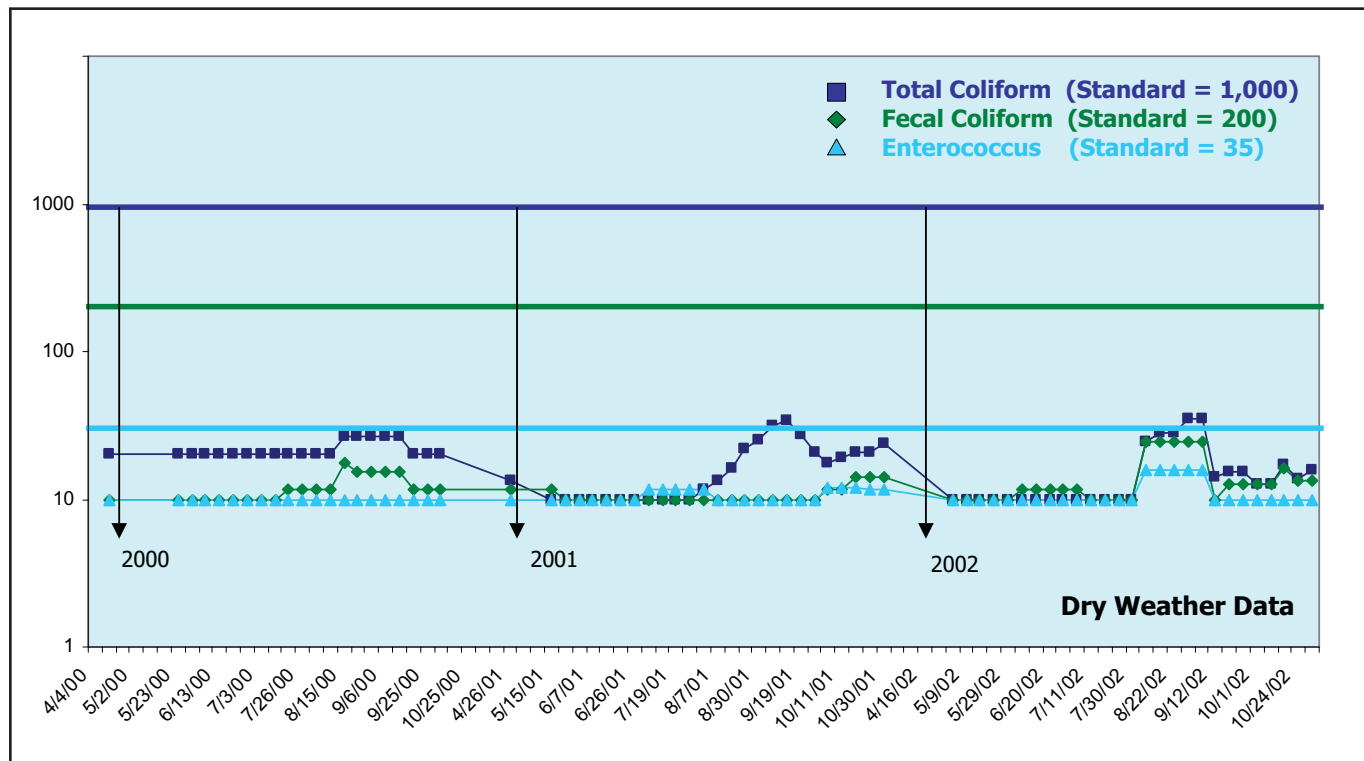


Newport Bay - Rocky Point Beach

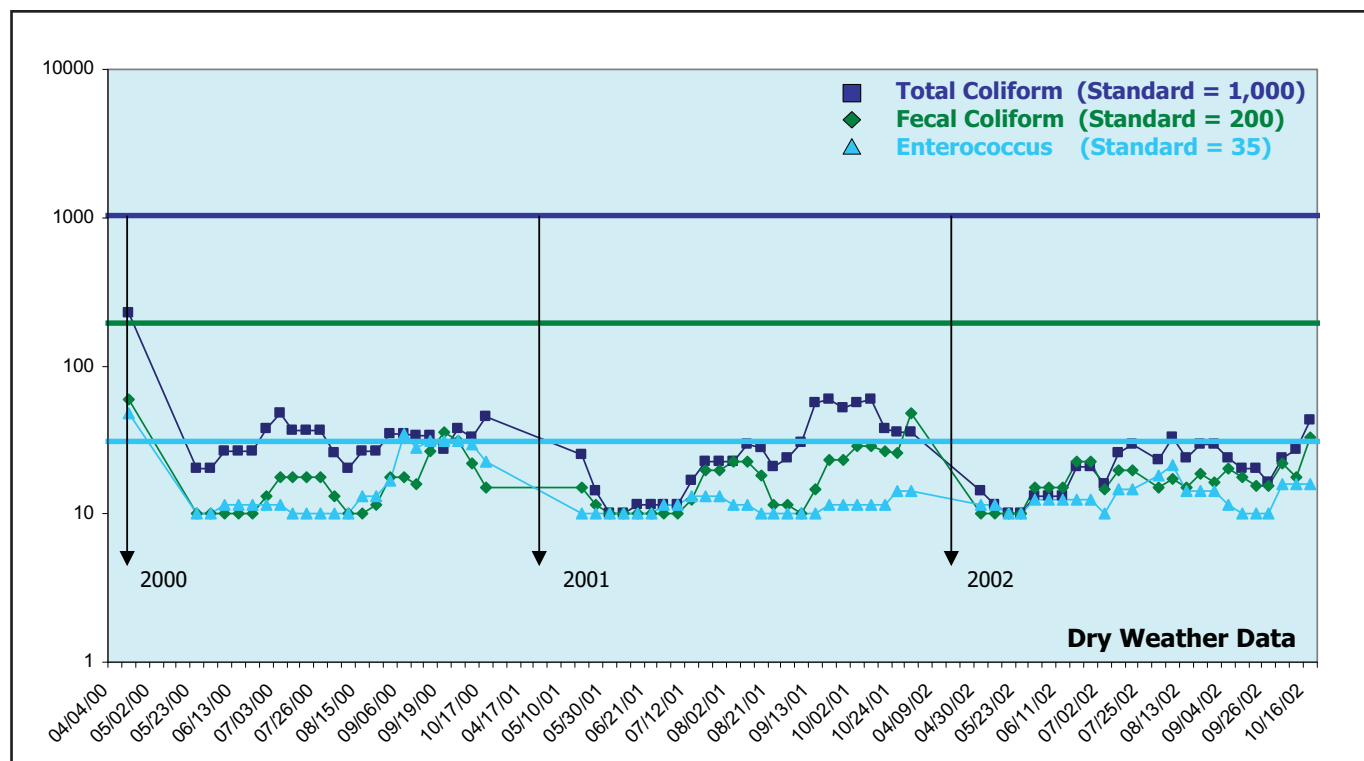
Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus AB 411 Periods (4/1 through 10/31), 2000-2002



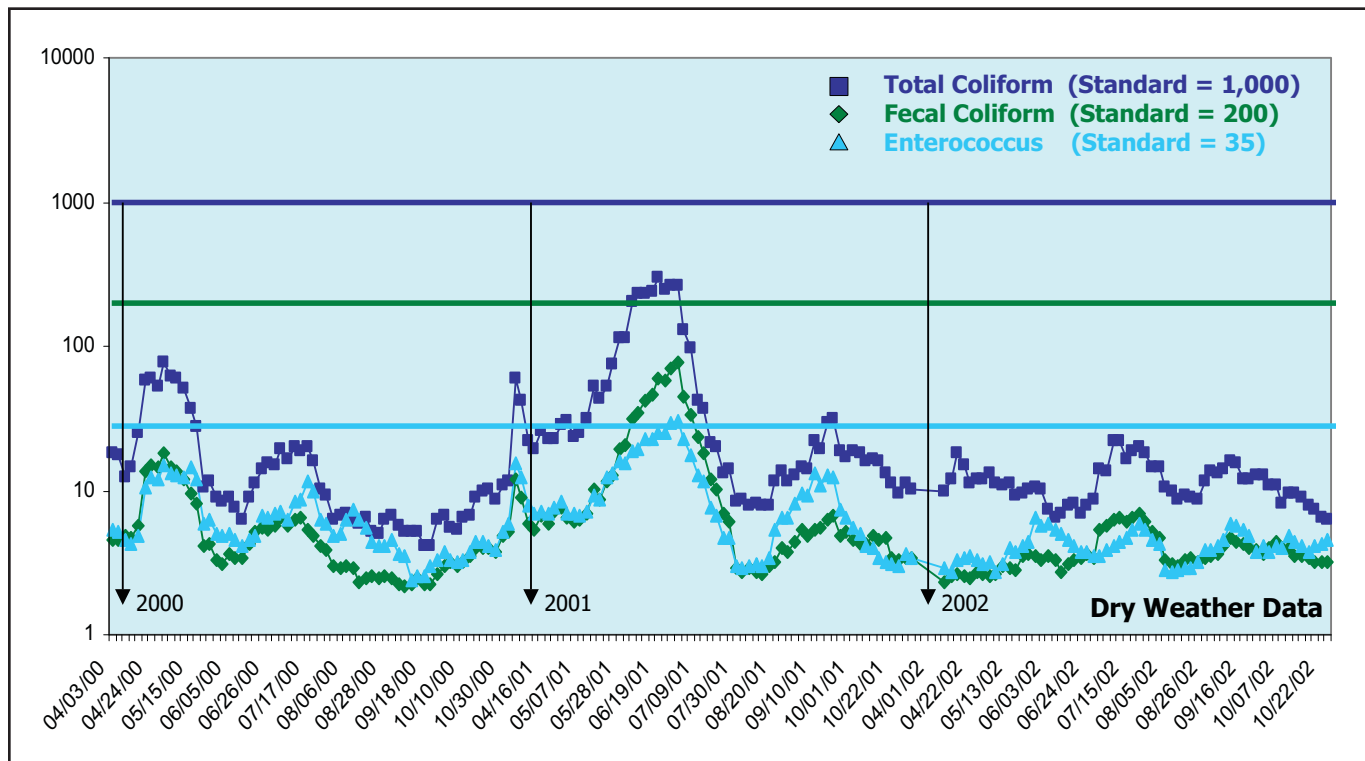
Laguna Beach - Crescent Bay **Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus** **AB 411 Periods (4/1 through 10/31), 2000-2002**



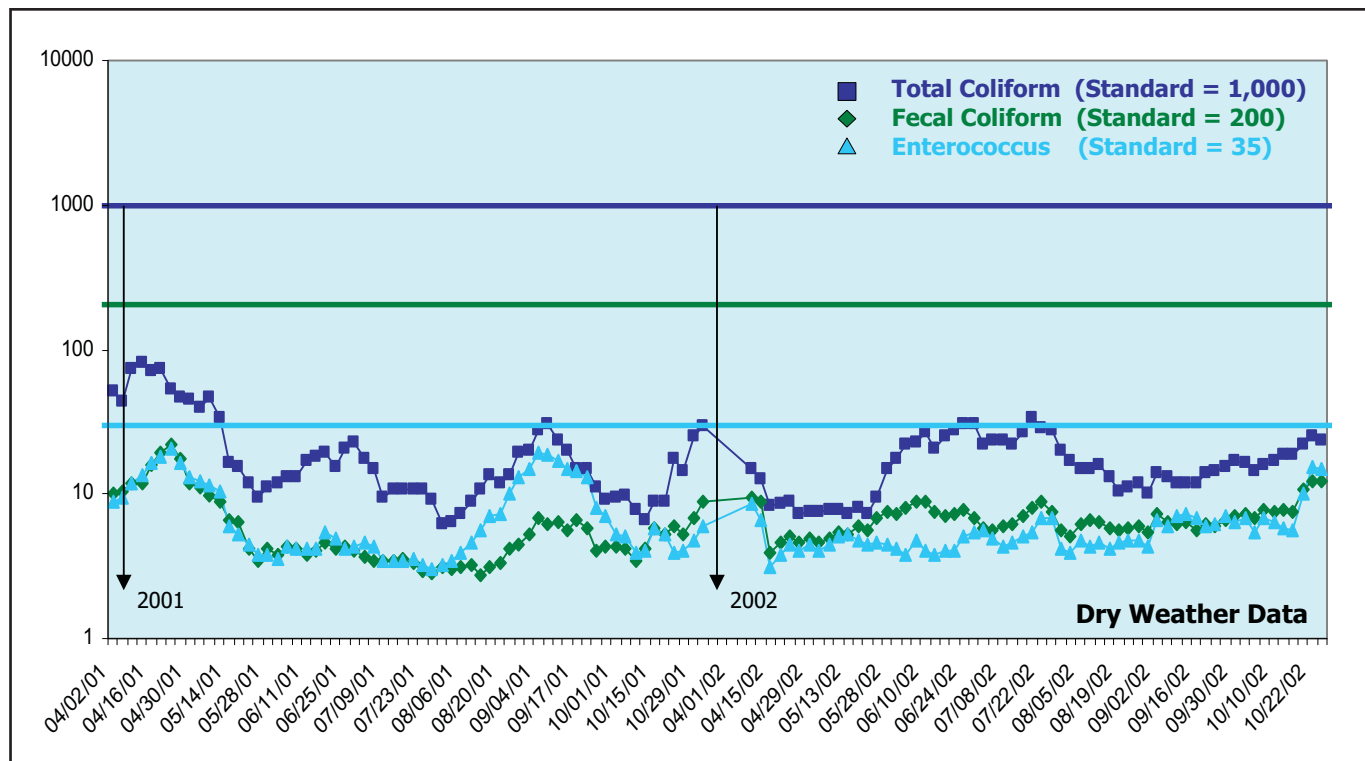
Laguna Beach - Main Beach **Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus** **AB 411 Periods (4/1 through 10/31), 2000-2002**



Aliso County Beach – North End of Beach **Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus** **AB 411 Periods (4/1 through 10/31), 2000-2002**

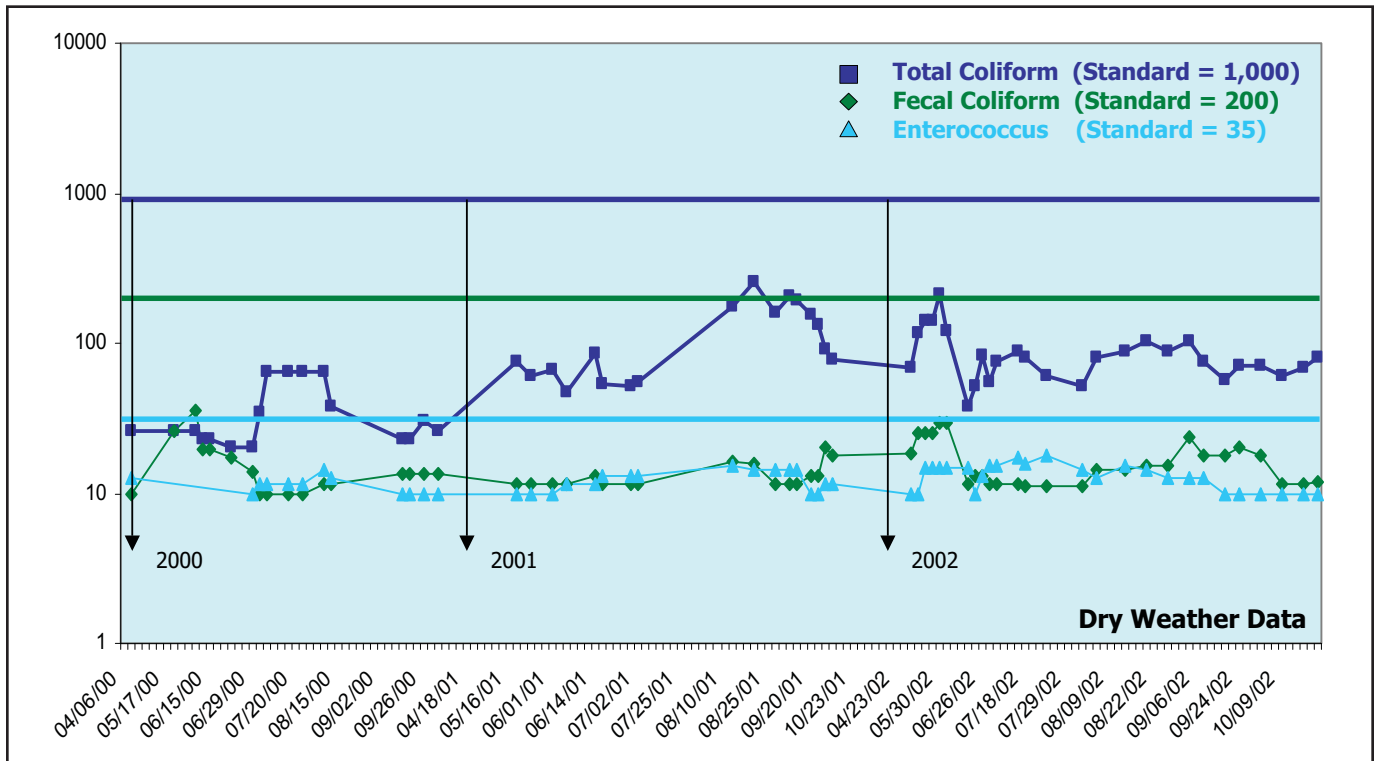


Aliso County Beach – Projection of Concession Stand **Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus** **AB 411 Periods (4/1 through 10/31), 2001-2002**



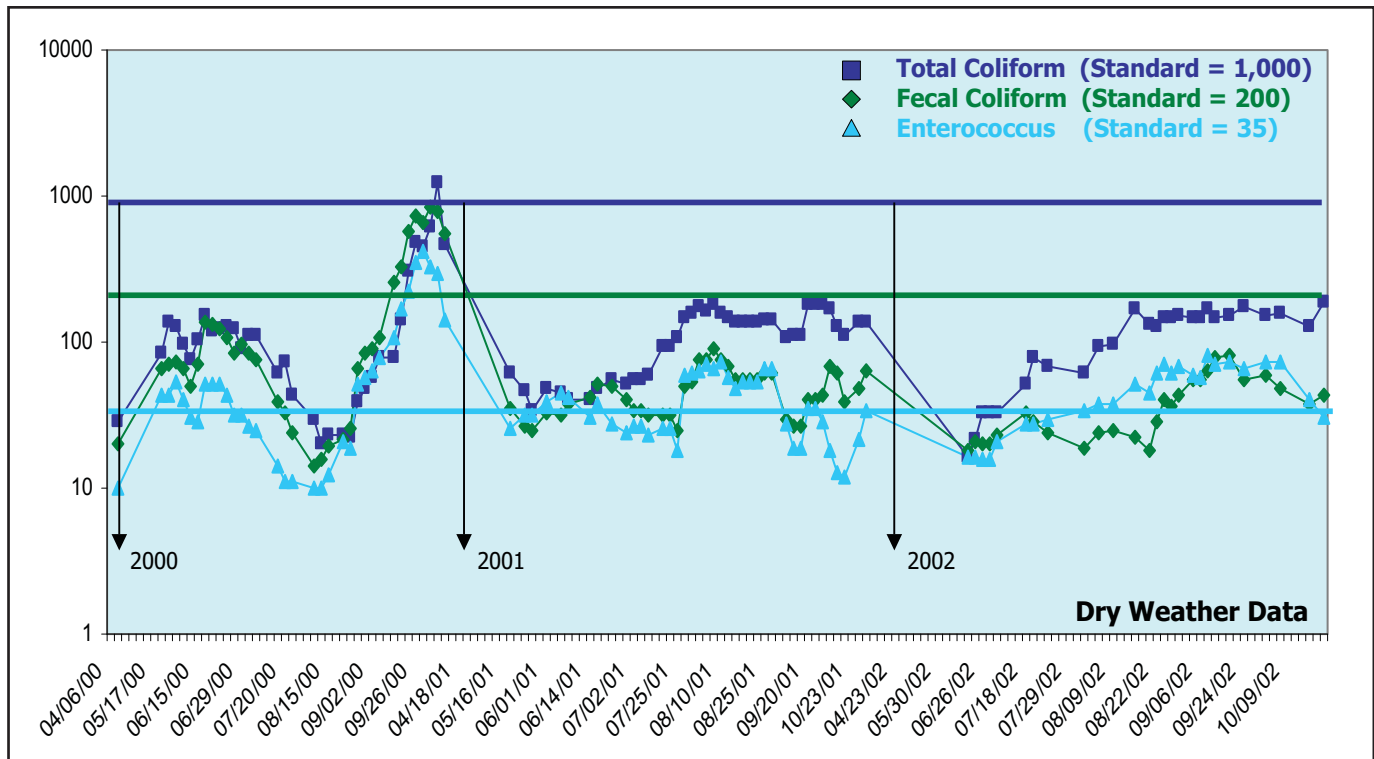
Dana Point Harbor - Guest Dock

Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus AB 411 Periods (4/1 through 10/31), 2000-2002



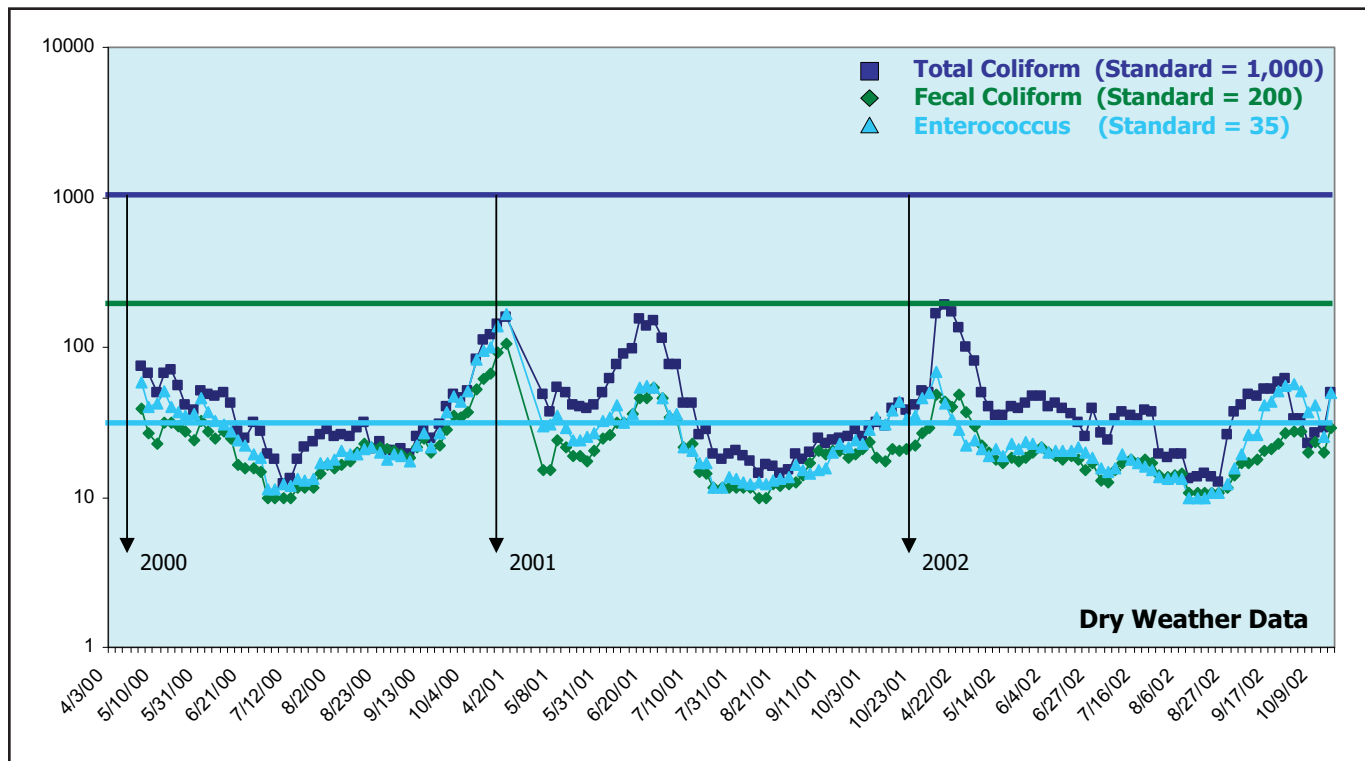
Dana Point Harbor - Baby Beach (Swim Area)

Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus AB 411 Periods (4/1 through 10/31), 2000-2002



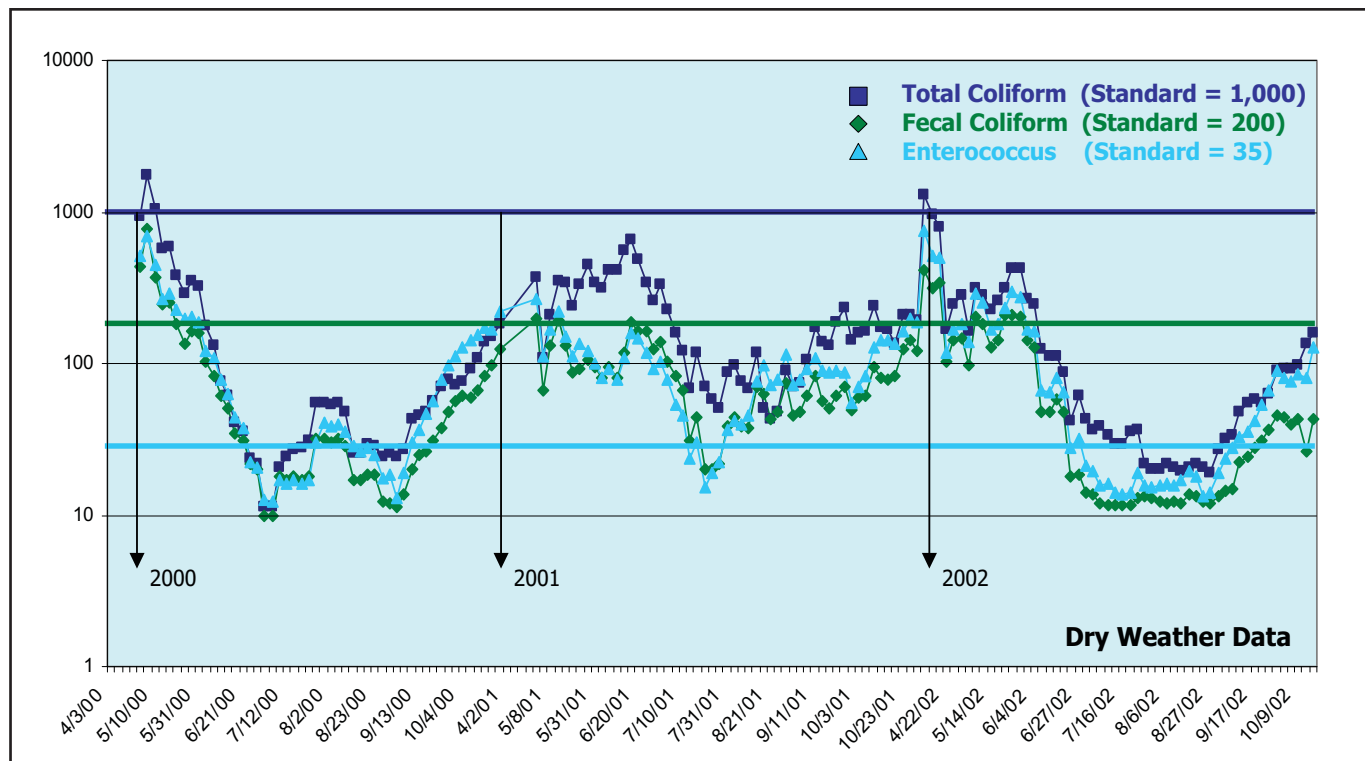
Doheny State Beach – Mid North Beach

Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus AB 411 Periods (4/1 through 10/31), 2000-2002

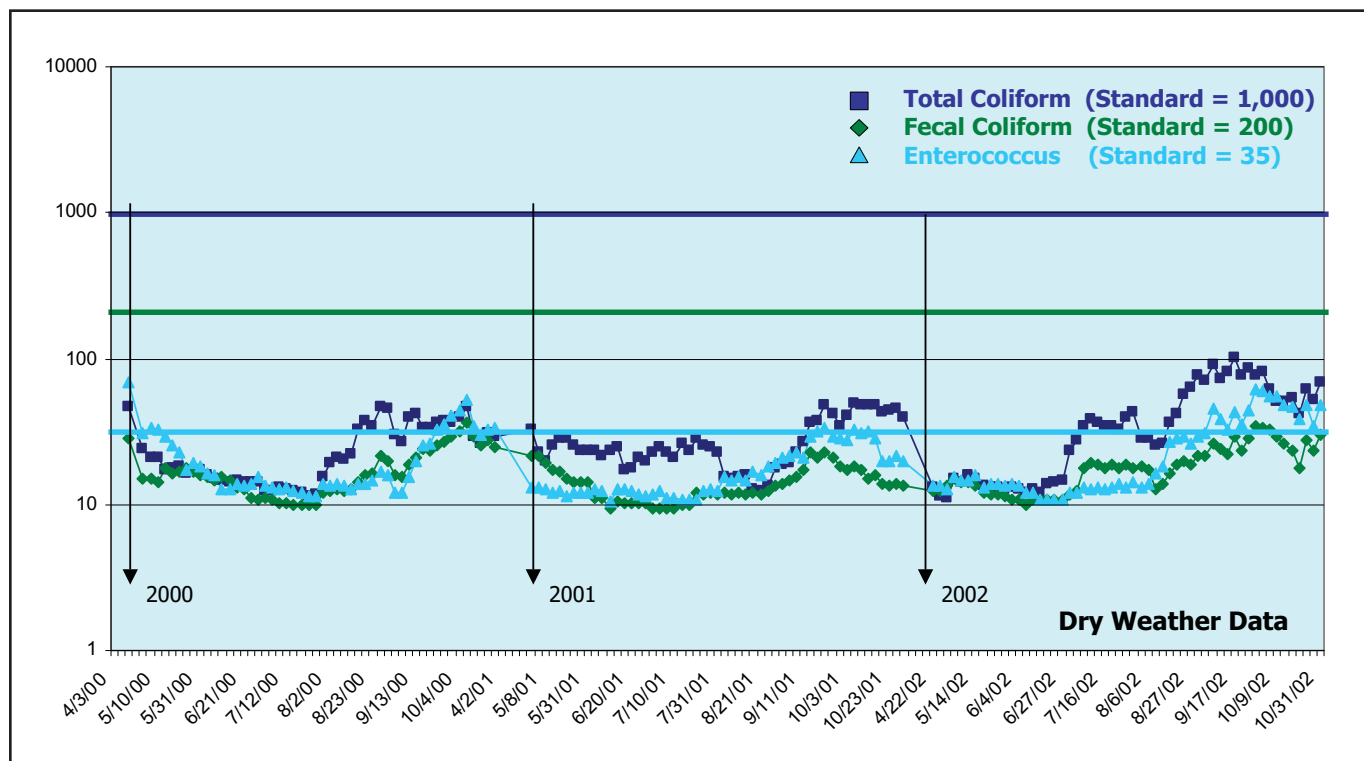


Doheny State Beach – San Juan Creek/Ocean Interface

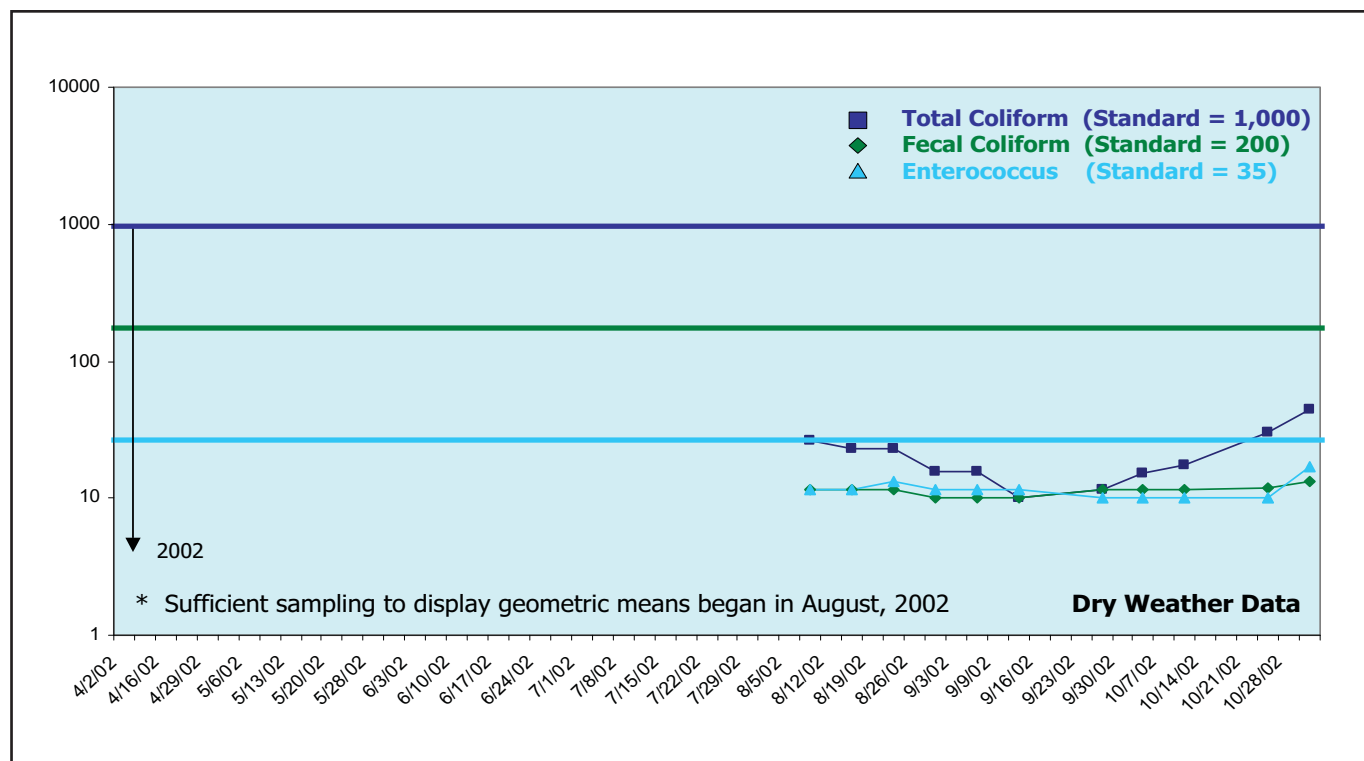
Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus AB 411 Periods (4/1 through 10/31), 2000-2002

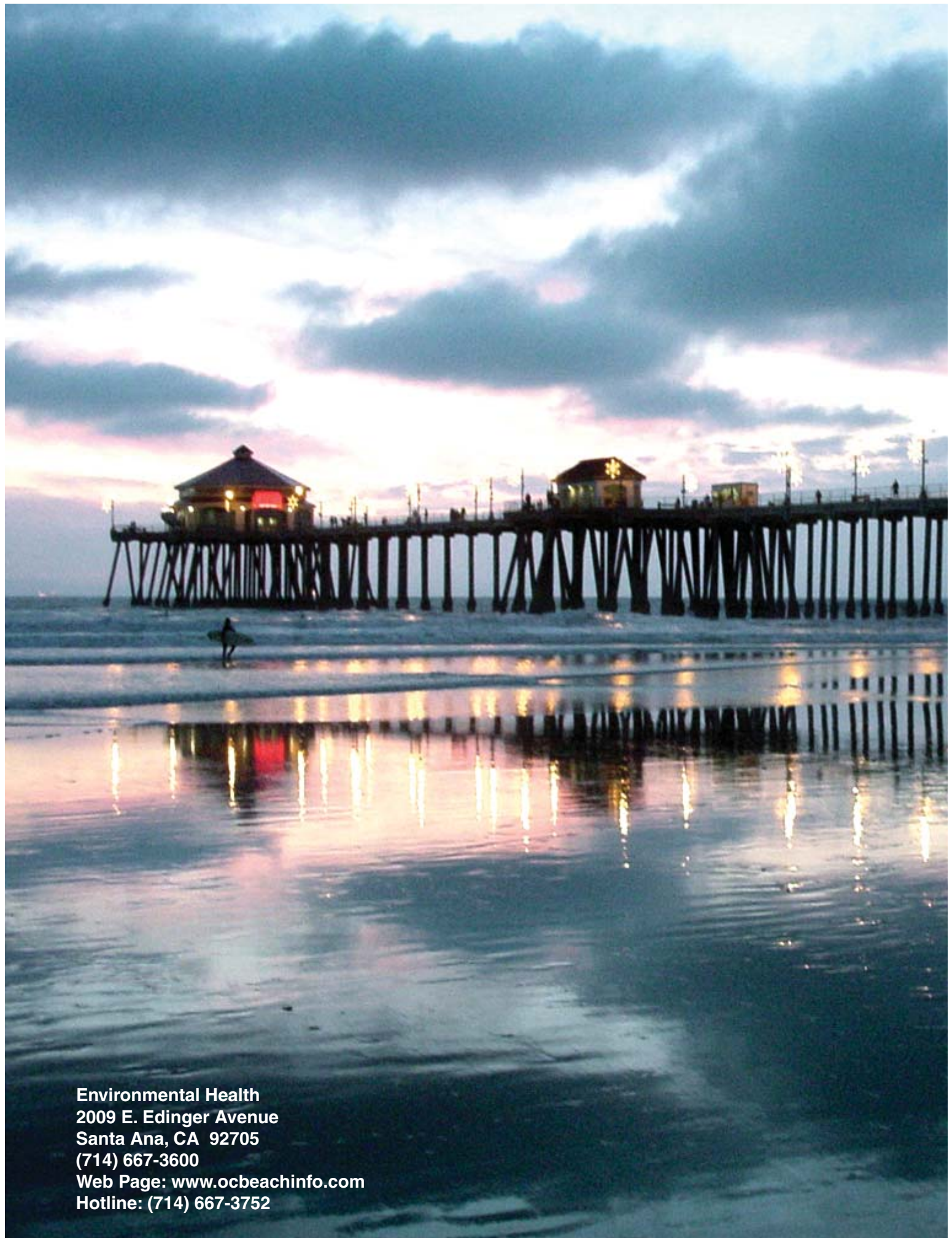


Capistrano Bay District Beach – North End of Beach
Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus
AB 411 Periods (4/1 through 10/31), 2000-2002



San Clemente City Beach – T Street
Running Geometric Means for Total Coliform, Fecal Coliform and Enterococcus
AB 411 Periods (4/1 through 10/31), 2002*





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